3.0 Human Interaction with the Natural Environment

3.1 Smart Growth

Introduction

Smart Growth in the Cowichan Valley Regional District

"Smart growth" is a concept that encourages compact, higher density community development, leaving rural areas for agriculture and forestry as well as ecosystem protection.[119] A smart growth community mixes residential and commercial uses, making it easy for people to walk or bicycle to jobs and services. Higher density residential areas are typically better served by public transit, schools, libraries, and other services.

While the Cowichan Valley Regional District (CVRD) has higher density nodes in communities such as Ladysmith, Duncan, Lake Cowichan, Chemainus, and Mill Bay, most of its population is quite dispersed. To achieve more smart growth, new growth and development should focus on nodal, higher density developments that gradually shift the balance away from sprawl. At this time, much of the development pressures are particularly intense around Cowichan Lake, Shawnigan Lake and just to the north in the Regional District of Nanaimo.

Growth in the region is managed by municipal governments within their jurisdiction (City of Duncan, District of North Cowichan, Town of Lake Cowichan and Town of Ladysmith). In the electoral areas, planning is the responsibility of the CVRD. Decisions made by these local governments – such as where to allow new subdivisions or infill development, what density of development to permit, and where to provide services such as piped water, sewers and roads – will influence the type of growth that occurs.

Measuring Smart Growth

To be able to tell the story of smart growth in the region, it would be ideal to be able to report on how land use has changed over time (and is expected to change in the near future), population density, how and where growth is occurring, whether people are within walking distance of shops and services (including public transit stops), and how they move around the region (for work and other purposes).

119 For more information on smart growth, see Smart Growth BC: www.smartgrowth.bc.ca

Statistics Canada tracks several relevant measures, including population and population density, housing type, and journey to work. Indicators included in this report are:

> Population density

> Compact housing

> Walkability of communities

> Proximity to transit

> Transportation modes: journey to work

> Maximum allowable parcel coverage

Population Density

Indicator and Measures

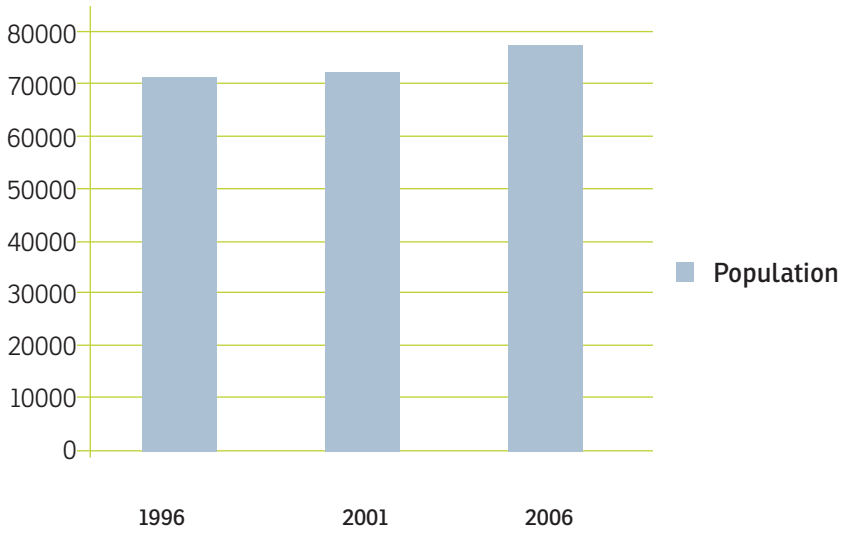
Statistics Canada tracks population data in its five-year census, both for the region as a whole and by census subdivision. Generally, the more densely populated a community, the better it meets smart growth criteria. For example, Smart Growth BC recommends having at least 15 residences per ha (1,500 residences/km^2) in order to make public transit a feasible option.

The census information is accurate and reliable, but incomplete for this report's purposes. For large electoral areas, an increase in population will show as increased density, but this does not indicate whether the additional population is being accommodated in higher density nodes or in a sprawled growth pattern. As well, census subdivision boundaries may change over time, making multi-year comparisons less reliable.

Findings

The Cowichan Valley Regional District has a land base of 3,473 km^2 with a population of 76,929 (2006 census). This gives an average population density of 22.1 people per km^2, much higher than the BC average of 4.4 people per km^2 but considerably lower than the Regional District of Nanaimo's 68.1 people per km^2.

FIGURE 3.1: CVRD Population, 1996–2006

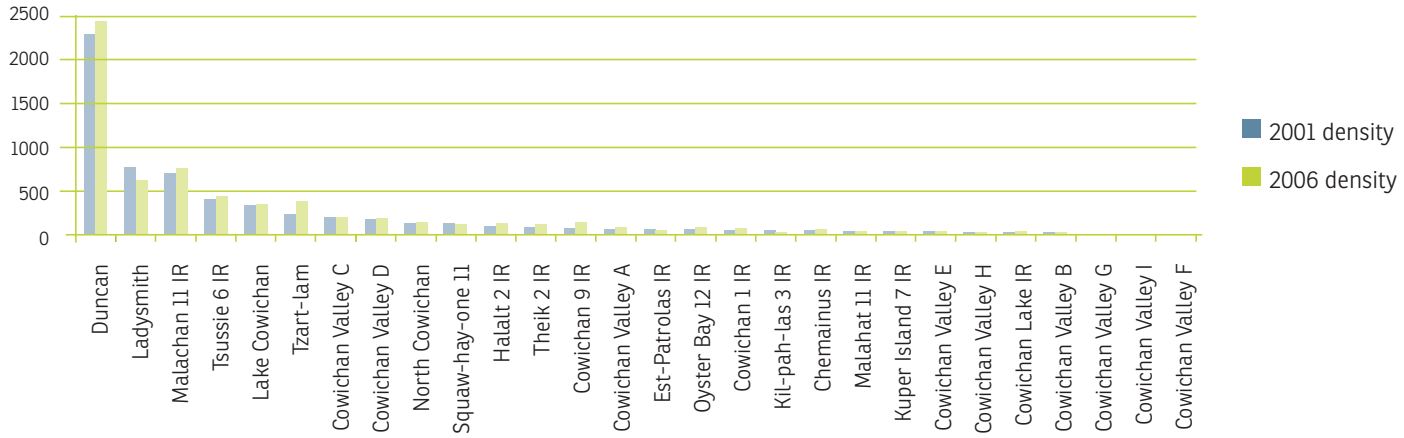


Source: Statistics Canada Census 1996, 2001, 2006

Population density of course varies considerably across the region. Figure 3.2 shows that the Town of Duncan has by far the highest density (2,430 people per km^2), with all other census subdivisions well under 800 people per km^2. Most of the electoral areas have very low density (below 200 people/km^2). [120]

120 For a map of electoral areas, see Figure 1.1 in Section 1.

FIGURE 3.2: Population density by census subdivision, 2001–2006



Note: Ladysmith shows a decline in density from 2001 to 2006 – this is due to a change in the area of the census subdivision.
Source: Statistics Canada Census 2001, 2006.

Compact Housing

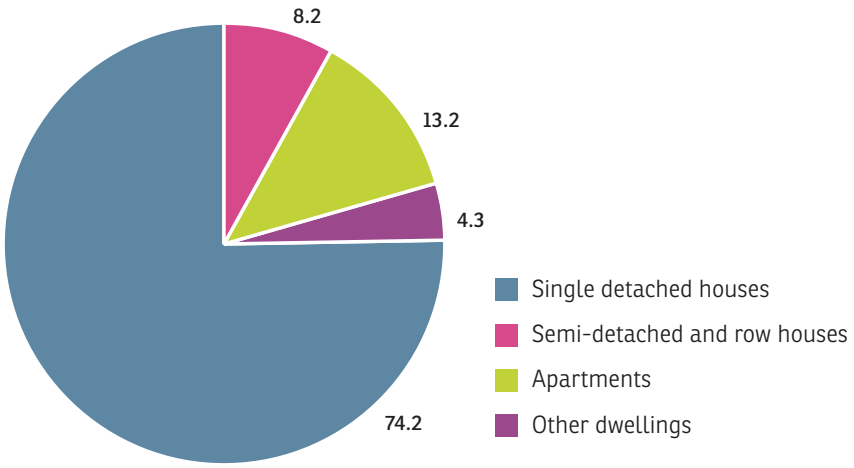
Indicator and Measures

Compact housing is a measure of dwelling unit type: single-family homes vs. duplexes vs. apartments or other forms of dwelling (e.g., trailers). A trend toward fewer single-family dwellings indicates an increase in residential density, which can help to reduce transportation-related energy use and emissions. Single-family detached housing makes up 49% of housing in BC.

Findings

About three-quarters (74%) of the housing stock in the Cowichan Valley region is single-family detached housing, with about 13% in apartments and 8% in semi-detached housing (Figure 3.3).

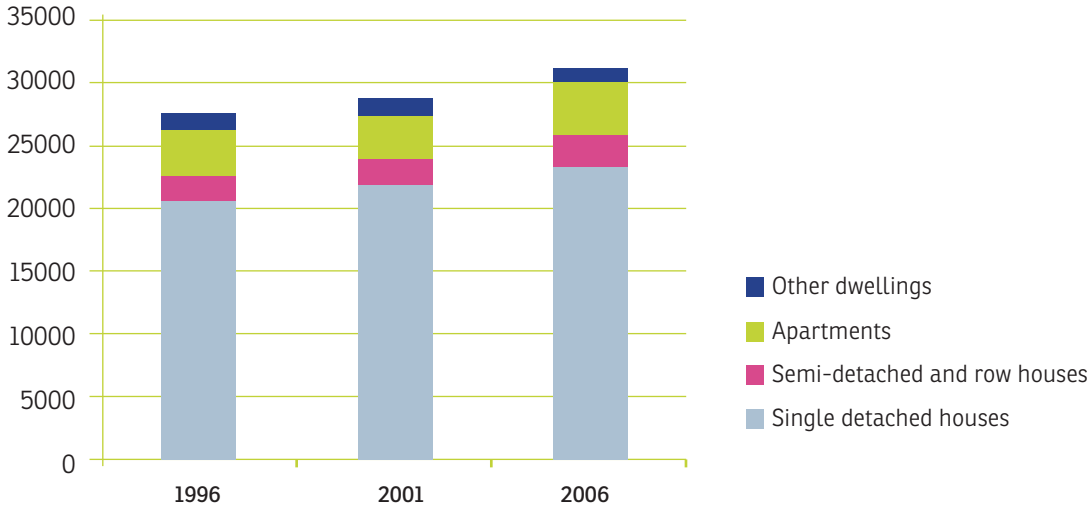
FIGURE 3.3: Housing stock (percentage of occupied dwelling type), CVRD 2006



Source: Statistics Canada Census, Community Profiles, 2006.

This overall percentage changed very little between 1996 and 2006, although the percentage of single family homes declined slightly (from 76.3% to 74.3%), with corresponding increases in apartment dwellings (11.9% to 13.2%) and semi-detached homes (6.7% to 8.2%) during this period (Figure 3.4). However, population growth continues to result in a growing number of single detached homes in the region.

FIGURE 3.4: Housing stock (by occupied dwelling type), CVRD 1996–2006



Source: Statistics Canada Census, Community Profiles, 2006.

Walkability of Communities

Walkable communities offer a lifestyle choice where people are less dependent on cars for their daily needs. Research[121] shows that walkable (and cyclable) communities are also healthier communities, as residents will incorporate more exercise into their daily routines.

Indicator and Measures

Walkscore.com provides an online ranking of the walkability of a given location, based on its proximity to services such as grocery stores, restaurants and coffee shops, cinemas, parks, libraries, drug stores and fitness facilities. This is based on Google data and shown in map form. Locations are given a ranking from a high of 100 to a low of zero.

Walkscore describes its rankings as follows:

> 90–100 = Walkers' Paradise: Most errands can be accomplished on foot and many people get by without owning a car.

> 70–89 = Very Walkable: It's possible to get by without owning a car.

> 50–69 = Somewhat Walkable: Some stores and amenities are within walking distance, but many everyday trips still require a bike, public transportation, or car.

> 25–49 = Car-Dependent: Only a few destinations are within easy walking range. For most errands, driving or public transportation is a must.

> 0–24 = Car-Dependent (Driving Only): Virtually no neighbourhood destinations within walking range. "You can walk from your house to your car."[122]

For the purposes of this report, a sample of locations across the region was entered into this program to rate their walkability. By its nature, this information is only as good as the data available from Google, and the sample locations do not provide a complete picture of the region. In addition, this information does not provide any trend data to show if walkability is improving or not. A preferred indicator would be one that measures the percentage of the region's population within walking distance of a defined suite of key services. However, in the absence of other more reliable data, it does provide some measure of the relative walkability of communities.

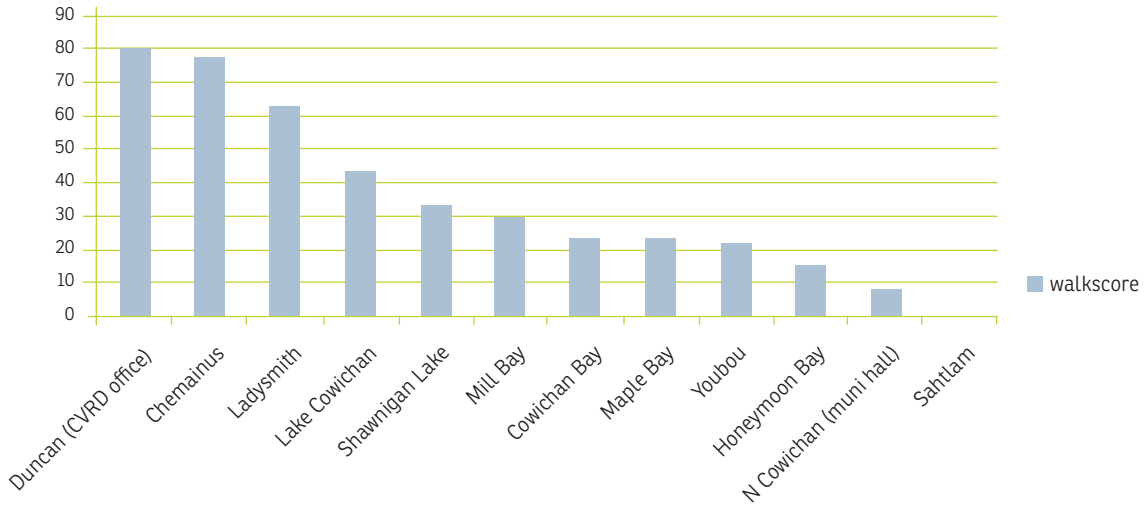
121 Frank et al, 2004.

122 www.walkscore.com/how-it-works.shtml

Findings

Data from walkscore.com show that the communities of Duncan, Chemainus and Ladysmith are considered very or somewhat walkable, while most other communities in the region are car-dependent (Figure 3.5).

FIGURE 3.5: Walkability of sample locations in the CVRD



Source: www.walkscore.com, accessed January 21, 2010.

Proximity to Transit

Indicator and Measure

People living close to public transit are much more likely to use transit services, especially if the routing and frequency of service meets their needs. BC Transit's annual performance summary (2008-09)[123] provides a summary of the population living within 400 m of transit routes. This information is generated by using the number of census blocks within 400 m each side of a transit route. Since most people start their journey with a walk from home to a bus stop, 400 m or less is deemed to be about the distance that most people are willing to walk to catch the bus (about a 10-minute walk).

Data to measure trends were not available for this report.

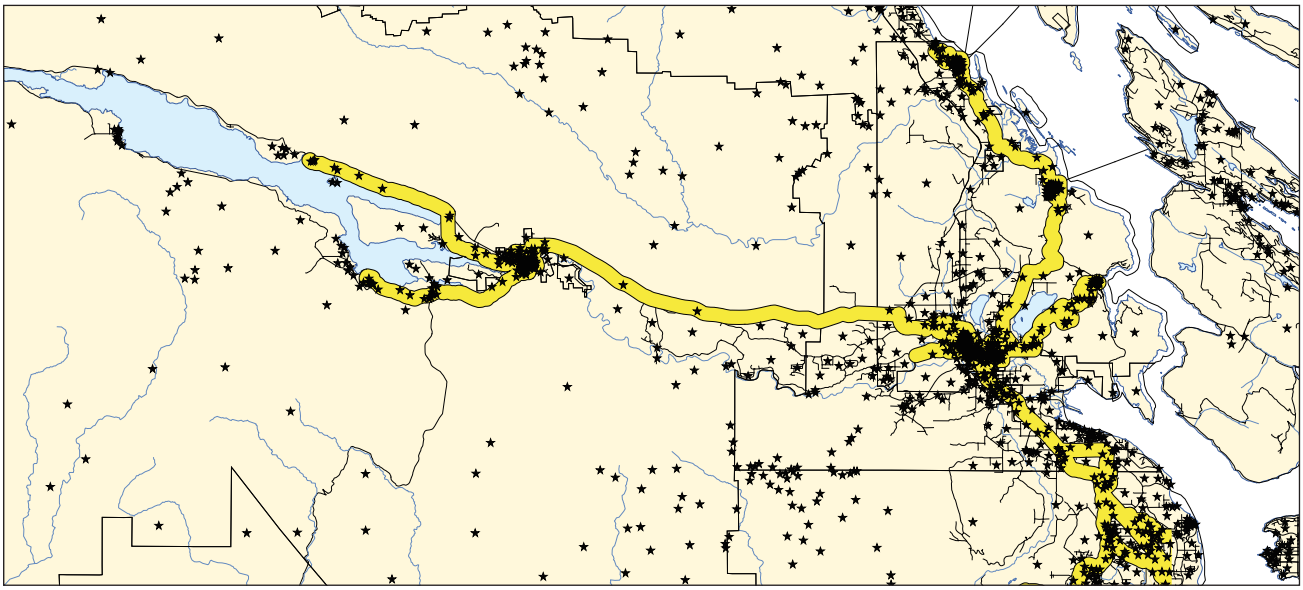
123 BC Transit, 2008/2009.

Findings

In 2008, about 38,100 people (half the region's population) lived within a 400m buffer around transit routes. This is mapped in Figure 3.6. This information does not indicate how far people would have to travel to a bus stop, nor the frequency of service along that route, both of which influence an individual's decision to take the bus instead of driving. For much of this area, bus frequency is well below the desired frequency (every 15-20 minutes during peak hours) that provides people with a realistic option to personal vehicle travel.

Also note that this map shows only part of the Cowichan Valley Regional District, since much of the region has no BC Transit service. The map does not include the new Duncan–Shawnigan–Victoria service that was started in 2008.

FIGURE 3.6: Population within 400 m of transit service, CVRD (Cowichan Lake east) 2008



Note: Each star represents a census block; not all census blocks are the same population. The yellow band is the 400m buffer around existing BC Transit routes.

Source: Peter Murray, Senior Transportation Planner, BC Transit.

Transportation Modes: Journey to Work

In a "smart growth" community, homes and places of work are close together, so that many residents can get to work by walking, biking or taking public transit. Where there are low- or medium-density settlement patterns – as seen throughout much of the Cowichan Valley Regional District – it is often impractical to offer a frequent transit service and most residents are too far from their workplace to be able to walk or cycle to work. However, communities such as Duncan and Ladysmith offer opportunities to walk or bicycle to work, or to car-pool with others.

The journey to work indicator provides insight both on the sprawl vs. smart growth nature of the region's land use, and on whether the trend is tending towards using lower-carbon methods to travel to work. Transportation is a significant contributor to greenhouse gas emissions, and this can be reduced by encouraging alternatives to automobile use.

Indicator and Measures

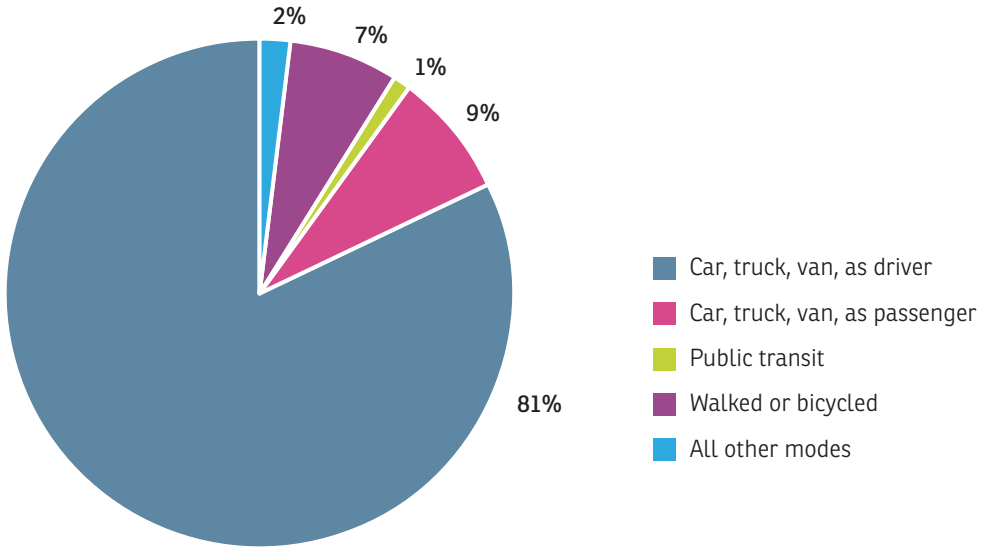
This indicator measures the mode of travel used by people as they journey to work: driving, riding as a passenger, walking/bicycling, via public transit, or other means. Statistics Canada tracks the mode of transportation to work by residents 15 years of age and over who worked at some time in the prior year (2001 and 2006 census). Census respondents are asked to identify the mode of transportation they most frequently use to commute from home to work.

This data is gathered by Statistics Canada as part of the five-year census. Journey to work data are not available for 1996. As well, the census tracks only the journey to work, and does not include data for other trips, e.g., for recreation or social purposes or to access services. This additional information would provide a more complete picture of total transportation activity in the region.

Findings

In 2006, by far the most common mode of transport to work was "vehicle driver" (81% of commutes). About 7% journeyed as a vehicle passenger, and a further 7% walked or bicycled (Figure 3.7).

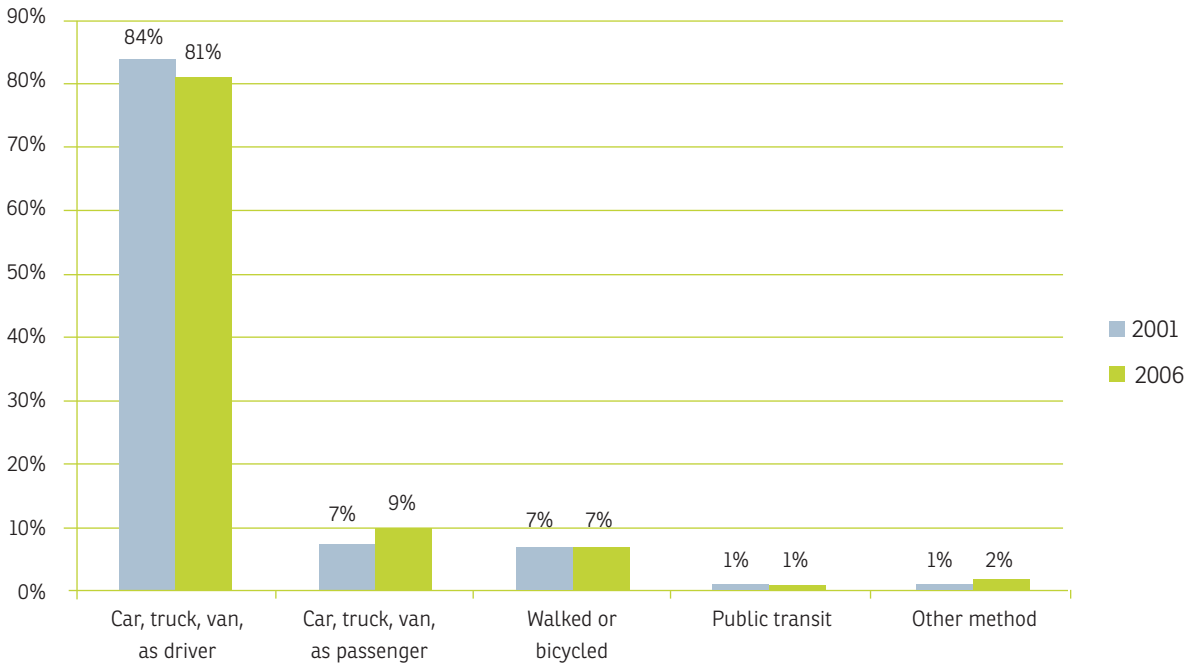
FIGURE 3.7: Journey to work mode share, CVRD, 2006



Source: Statistics Canada, 2006 Census.

When compared to 2001 census results, there has been a slight decline in the number of drivers (from 84% to 81%), with a consequent increase in the number of passengers (from 7% in 2001 to 9% in 2006) and a very small (less than one percent) increase in transit users (Figure 2). On average, more men than women travelled by private vehicle, women were more likely than men to take transit or walk/bike.

FIGURE 3.8: Journey to work mode share, CVRD 2001 and 2006



Source: Statistics Canada, Census 2001 and 2006.

Results varied across the region, however. In the City of Duncan, the percentage of drivers dropped from 72% in 2001 to 66% in 2006, while journeys by walking or bicycling increased from 16% to 19%. In the Town of Lake Cowichan, the percentage of drivers remained constant (71%), while transit users increased (from 1% to 2%) and those walking/bicycling decreased from 14% in 2001 to 10% in 2006.

Many residents of the Cowichan Valley region work in Victoria, and the Jack Bell Foundation provides vanpool and carpool vehicles for these commuters. Table 3.1 provides a summary of the number of vans and cars leaving various destinations in 2002 and 2009. It should be noted that the number of vans leaving Duncan and Cobble Hill/Shawnigan Lake has dropped in response to the launch of BC Transit's Malahat commuter bus service in 2008.

TABLE 3.1: Jack Bell Vehicles 2002 and 2009

From	To	2002 Vans 8 Pass.	2002 Cars 4 Pass.	2009 Vans 8 Pass.	2009 Cars 4 Pass.
Nanaimo	Victoria- Downtown	3		1	
Ladysmith	Victoria- Downtown	0		1	
Cowichan Bay	Victoria- Downtown	2		2	
Lake Cowichan	Victoria- Downtown	1			1
Duncan	Victoria- Downtown	8		6	1
Duncan	Esquimalt	1		1	1
Shawnigan Lake	Victoria- Downtown	3			1
Cobble Hill	Victoria-Downtown	6	1	2	1
	Total	24	1	13	5

Source: Leon Teubes, 2010.

Maximum Allowable Parcel Coverage

The various land-use zoning designations within the CVRD permit buildings to cover up to a certain percentage of a property. Buildings – and the roads, sidewalks, parking lots and other features that accompany them – create impervious surfaces that do not allow water to soak into the soil.

Under natural forest conditions, about 55% of the water from a rainfall will soak into the ground (the rest is absorbed by plants or evaporates). This water soaks into the soil, either recharging groundwater or gradually travelling through the ground to reach streams and lakes. Only a very small amount (about 1%) runs over the land surface.[124] Changes to the landscape create more impervious surfaces, where almost all of the rainfall runs over the land (picking up oils and other pollutants) and is then collected via storm drain systems which pipe the polluted water directly to creeks. In a suburban development, as much as 25% of rainwater becomes overland runoff, and in paved parking lots it can be close to 100% runoff.[125] Lawns, clearcut forest areas and agricultural lands can also increase overland runoff, especially on slopes.

124 Ministry of Water, Land and Air Protection and Environment Canada, 2002.

125 Ibid.

These changes create harmful impacts to waterways and property. Water reaches streams and creeks more quickly than under natural conditions, eroding streambeds and banks and resulting in the loss of fish habitat such as salmon spawning areas. There is less water soaking into the soil, resulting in less aquifer recharge for drinking water, and less groundwater to supply streams during dry summer months. It is estimated that significant changes to streams occur when impervious surface cover exceeds 10%, and significant damage to streams occurs when impervious surface cover is more than 30%.[126]

This indicator is an important aspect of smart growth because how we develop communities affects how much impervious surface is created, which in turn affects the health of the Cowichan Region's waterways.

Measures

The Cowichan Valley Regional District has calculated the impervious surface that could be created if all properties were built out to the maximum allowable in the current OCP zoning, by watershed. This allowable amount of impervious cover varies by zone.

Note that the results show the amount of impervious surface that could be created if full build-out were to occur, not the actual amount of impervious surface, which is unquantified a this time.

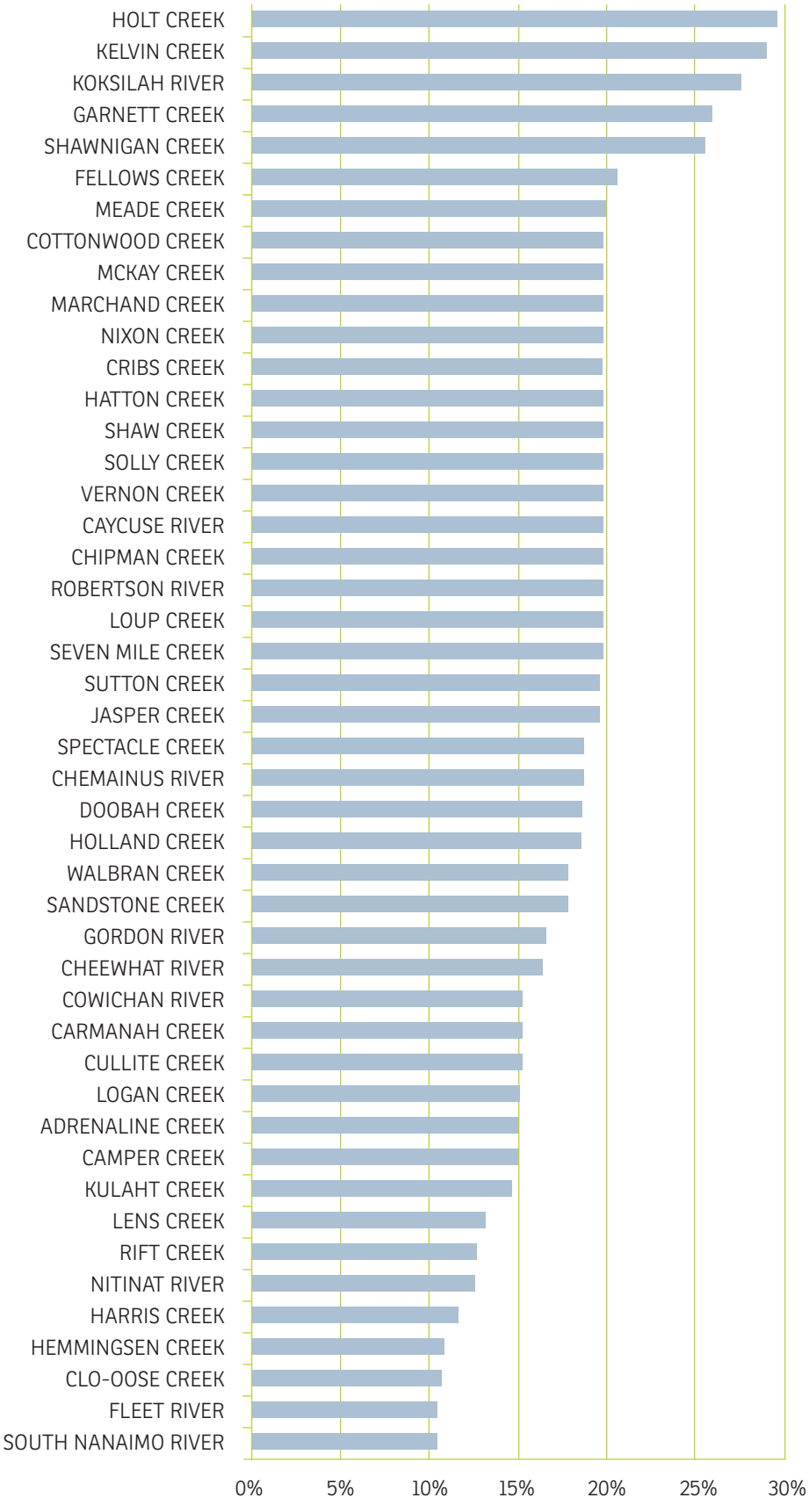
Findings

The results show that maximum allowable parcel coverage could create very high levels of impervious surface for many watersheds. Of the region's 68 watersheds, only 23 (one-third) of the watersheds would be below 10% impervious cover if maximum build-out were to occur. The rest would be between 10% and 30% impervious, with Holt Creek, Kelvin Creek, the Koksilah River, Garnett River and Shawnigan Creek coming very close to levels that would result in significant damage to stream ecology.

If such build-out were to occur, the impacts on the region's streams and waterways could be devastating.

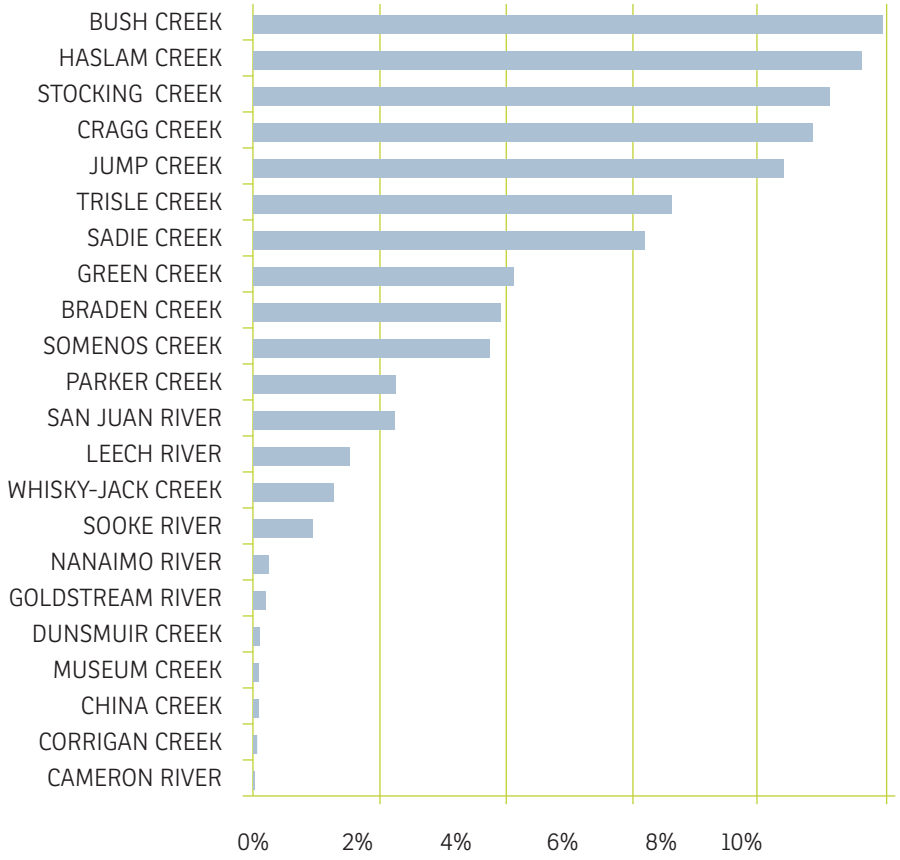
126 Schueler, 1995.

FIGURE 3.9: CVRD watersheds with 10–30% impervious cover based on zoning



Source: CVRD, 2010.

FIGURE 3.10: CVRD watersheds with less than 10% impervious cover based on zoning



Source: CVRD, 2010.

It would be helpful to be able to compare the actual impervious surface areas to these figures, so that more meaningful information on the current impact of impervious surfaces could be analyzed.

Summary

The Cowichan Valley Regional District has a population of about 77,000, and this number continues to grow. While some of the population is concentrated in higher density areas (such as Duncan), much of it is dispersed, with fewer than 200 people/km^2 in most parts of the region. This makes "smart growth" development very hard to achieve. About three-quarters of the population lives in single detached homes, and in communities where they are dependent on cars for most daily needs and errands. And, while many

people live close to a transit route, the frequency of service along these routes does not always make transit a practical option. The exceptions are the new bus services to the Victoria area, which together with the Jack Bell vanpool service helps to take several vehicles off the road. However, about 90% of commuters travel to work by personal vehicle, with the vast majority of these as single occupant drivers.

Of considerable concern is the impact that could occur as a result of maximum build-out of allowable parcel coverage. While this is unlikely to happen to its full extent, it does raise the question of future impervious surface cover and the potential for impacts on streams and waterways.

Missing Information

At this time there is no reliable, regionally-consistent data on the location of new growth (is new development supporting density or sprawl?) and proximity to services such as food stores, schools, libraries, etc. (are people living close to services?). Also, it would be useful to be able to report on actual impervious surface cover, as this would give a better indication of the potential for harm to the region's streams and waterways.

References

BC Ministry of Water, Land and Air Protection and Environment Canada. 2002. Stormwater Management Planning: A Guidebook for British Columbia. www.env.gov.bc.ca/epd/epdpa/mpp/stormwater/stormwater.html

BC Transit. 2008/2009. Conventional Transit Information and Performance Summary.

Frank, Lawrence D., Martin A. Andresen, and Thomas L. Schmid. 2004. Obesity Relationships With Community Design, Physical Activity, and Time Spent in Cars. American Journal of Preventive Medicine Vol. 27. No 2. June, 2004, pp. 87-97. www.act-trans.ubc.ca/smartraq/files/FRANK-AJPM-04-obesity.pdf

Murray, Peter. 2010. Senior Transportation Planner, BC Transit. Personal Communication.

Schueler, Thomas R. 1995. The Peculiarities of Perviousness. Watershed Protection Techniques 2, 1: 233-38.

Statistics Canada. 2001 Community Profiles. www12.statcan.ca/english/Profil01/CP01/Details/Page.cfm?Lang=E&Geo1=CD&Code1=5919&Geo2=PR&Code2=59&Data=Count&SearchText=cowichan&SearchType=Begins&SearchPR=59&B1=All&Custom= Accessed December 30, 2009.

Statistics Canada. 2006 Community Profiles. www12.statcan.ca/census-recensement/2006/dp-pd/prof/92-591/details/page.cfm?Lang=E&Geo1=CD&Code1=5919&Geo2=PR&Code2=59&Data=Count&SearchText=Cowichan Valley&SearchType=Begins&SearchPR=01&B1=All&Custom= Accessed December 30, 2009.

Teubes, Leon, 2010. Executive Director, The Jack Bell Foundation. Email to Jenny Farkas. January 22, 2010.

3.2 Farm Land and Food Security

Introduction

Farm Land and Food Security in the Cowichan Valley Regional District

Food and agriculture are key components of the Cowichan Region's economy. The maintenance of a productive farming community supports local food production, which in turn reduces transportation-related greenhouse gas emissions[127], fosters self-sufficiency, provides insurance against disruptions in food supply, and protects consumers from increases in food prices due to rising fuel costs.

Farm land also provides key ecological services such as habitat for wildlife, refuelling areas for winter bird migration and pervious surfaces for groundwater recharge, and it contributes to the rural feel of the region. Organic waste (appropriately processed) can be applied on farmland, reducing the volume of material sent to the landfill and improving soil productivity.

Cowichan's temperate climate and fertile soils allow for year-round food production, and the area is well suited to many different agricultural activities – particularly at lower elevations along the east coast of the region.[128] The rivers, lakes, ocean and forest provide additional food sources, including fish, shellfish, sea vegetables and mushrooms.

Imported food travels an average of 2,500 kilometres from farm to plate.[129]

Measuring Farm Land and Food Security

In measuring the state of farm land and food security, it would be ideal to be able to track trends in the total amount of land capable of being farmed versus the area actually being farmed in the region, as well as the kinds of food being grown relative to regional food production targets, the amount of food being purchased locally versus imported from out of the region, and the sustainability of agri-business (which provides economic stimulation for communities, income and employment generation for farmers, and food security for citizens).

127 The fossil fuels and other resources needed to grow, package and transport food in large quantities contributes significantly to greenhouse gas emissions (3% in BC and Canada, 8% in the US, 14% worldwide) and environmental depletion.

128 Cowichan Economic Development Commission (CEDC), 2009. Cowichan Region Area Agricultural Plan–State of the Industry Report and Visions, Goals and Objectives addendum.

129 The average North American meal travels close to 2,500 kilometres from farm to plate. (http://www.organicagcentre.ca/Docs/LocalFoodProcurementPolicies.pdf) To transport this average meal, we consume 4 to 17 times more petroleum than if the same meal were made from local ingredients. (Worldwatch Institute http://www.worldwatch.org/node/1749)

Considerable data have been collected for the 2009 Cowichan Region State of the Agriculture Industry report, and additional data are available from the Agricultural Land Commission and Statistics Canada's Census of Agriculture.

Indicators included in this report are:

> Local food production (food security)

> Farm land – total available and percentage in use

> Farm size and productivity

> Crop/livestock diversity

Local Food Production

Indicator and Measures

The Cowichan Region is one of the major agricultural areas on Vancouver Island, and has the potential to produce much of the food its residents need. Historically, the region produced large volumes of vegetables, berries and dairy products that fed a significant portion of the population;[130] as recently as 50 years ago, Vancouver Island farmers produced 85% of the Island's food.[131]

The Cowichan Agricultural Area Plan's Visions, Goals and Objectives document establishes a goal of 45% local food production, and has translated this goal into finite targets for food production.[132] These targets are based on the number of hectares needed to produce a healthy diet for the current population of the Cowichan Region, as outlined in the Canadian Food Guide.[133]

Findings

The Cowichan Economic Development Commission estimates that the Cowichan Region currently produces about 18% of its total food needs (Vancouver Island produces approximately 10% of the Island's total food needs).[134]

130 Cowichan Economic Development Commission, 2009.

131 Scott, 2004.

132 Cowichan Economic Development Commission. 2009.

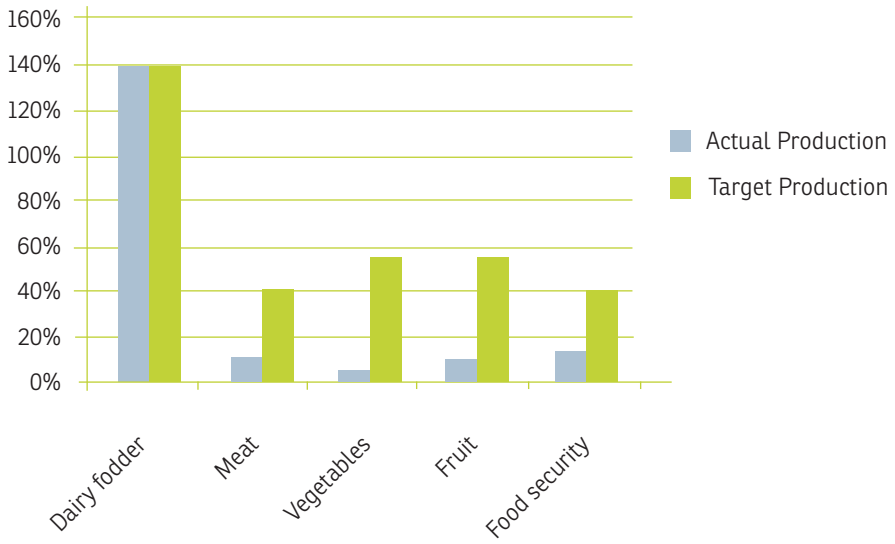
133 As outlined in "BC's Food Self-Reliance" www.agf.gov.bc.ca/resmgmt/Food_Self_Reliance/BCFoodSelfReliance_Report.pdf

134 Haddow, 2004.

In applying a regional goal of 45% local food production/food security, it becomes evident that Cowichan is producing more than enough fodder (e.g., hay, grasses, grains grown to feed dairy cattle), while the production of meat, fruits and vegetables are well below desired levels (Figure 3.11).

Data for seafood, non-timber forest products (e.g., mushrooms) and food grains were not available.

FIGURE 3.11: Actual food production versus food security targets



Source: Cowichan Agricultural Area Plan Visions, Goals and Objectives, 2009.

As part of its Food Security Mapping Project, the Cowichan Green Community is developing a 2010 local food map that will link customers with local farmers selling fresh food. www.cowichangreencommunity.org

Farm Land – Total Available and Percentage in Production

Indicator and Measures

The 2006 Cowichan Agricultural Area Plan used Canadian and BC agricultural land ranking systems[135] to determine how much of the region's land base is capable of agricultural production. These systems consider climate and soil characteristics, topography, drainage, and other landscape characteristics, and are not based on the current use of the land.

Part of the region's agricultural land base is protected through the Agricultural Land Reserve (ALR). Each year, the Agricultural Land Commission tracks the amount of land that is added to (inclusions) or removed from (exclusions) the ALR. This data does not monitor whether ALR land is actually being used for agricultural purposes, or what is being grown on that land.

Statistics Canada's Census of Agriculture records the amount of reported land being farmed (within and outside the ALR). This information is also monitored by the Ministry of Agriculture and Lands.

Findings

Total Available Farm Land

Almost 10% of the Cowichan Region's land base – or roughly 33,000 ha – is arable land, meaning land that can be cultivated. Of the region's 33,000 ha of arable land, roughly 50% (16,000 ha) is capable of producing crops such as vegetables, grains and fruit, and approximately 35% (9,400 ha) is considered prime agricultural land (suitable for a wide range of crops).[136]

When the Agricultural Land Reserve was established in 1974, it served to protect close to 22,000 ha of agricultural land. As of March 2008, there are about 17,700 ha of ALR in the Cowichan Valley Regional District (Table 3.2 and Figure 3.12) – for a net loss of approximately 4,300 ha.

While the overall trend for the past 35 years shows agricultural land being removed from the ALR and converted to other uses (residential development, industrial land, recreation facilities, and transportation infrastructures[137]), since 2000, the amount of ALR land has increased by 30 ha.

135 These ranking systems are the Canada Land Inventory and the Land Capability Classification System for Agriculture in British Columbia. Both systems identify land according to its potential and limitations for agriculture using a rating system of Class 1 to 7.

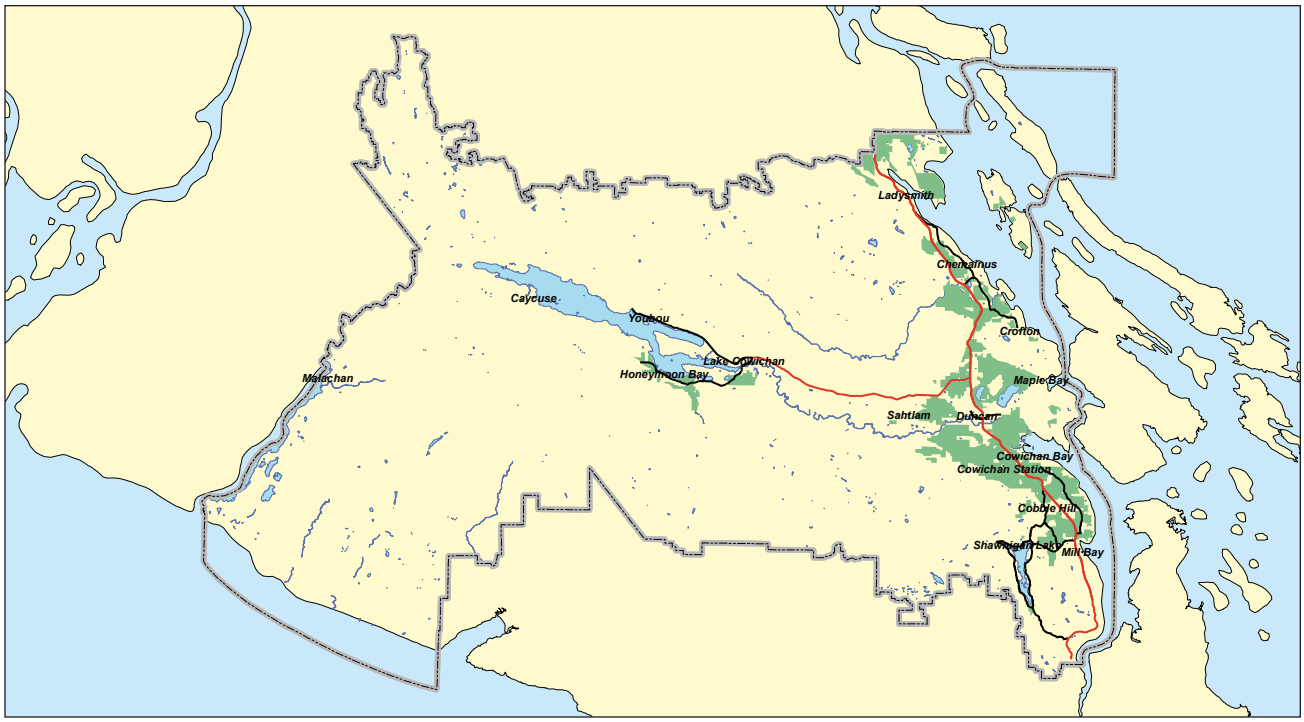
136 Cowichan Economic Development Commission, 2009.

137 Scott, 2004.

TABLE 3.2: Change in ALR, 1974–2008

	1974-2008	2000	2001	2002	2003	2004	2005	2006	2007	2008	2000 - 2008
Area at designation (ha)	21,984.0										
Inclusions (ha)	420.0	0.0	0.0	14.0	0.0	2.4	80.9	0.0	54.3	5.0	156.6
Exclusions (ha): govt	3,628.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Exclusions (ha): landowner	1,054.0	0.0	0.0	35.0	18.2	36.8	3.0	0.0	30.0	4.0	127.0
Net change (ha)	-4262	0.0	0.0	-21.0	-18.2	-34.4	77.9	0.0	24.3	1.0	29.6
Area as of March 31, 2008 (ha) 17,722											

FIGURE 3.12: Location of Agricultural Land Reserve parcels, 2009



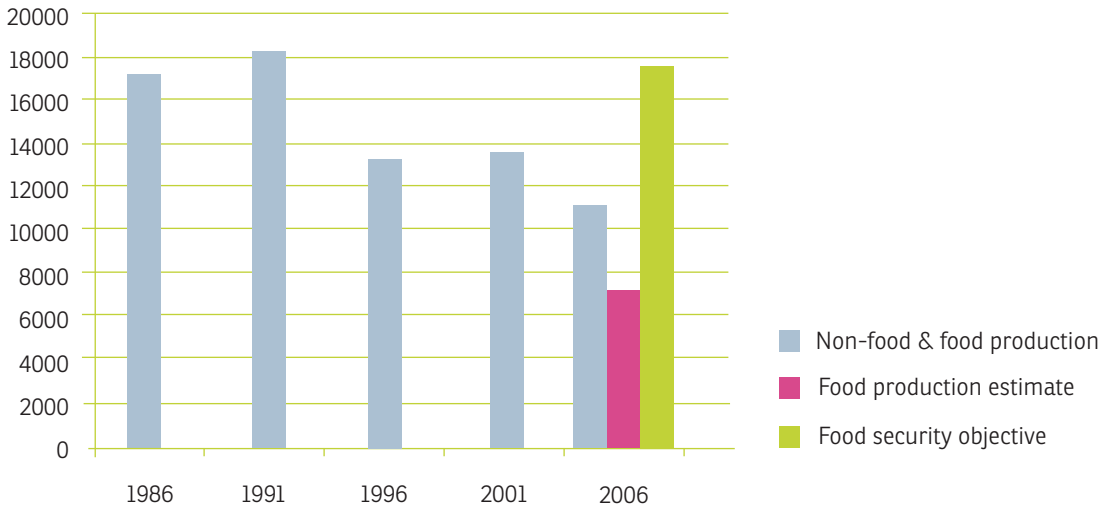
Source: Cowichan Green Community, 2009.

Percentage of Farm Land in Production

The reported amount of land being farmed has shrunk from a high of more than 18,600 ha in 1991 to about 11,600 ha in 2006 (Figure 3.13).[138] This figure of 11,600 ha includes non-food items (e.g., Christmas trees, vineyards, maple tree taps, sod, flowers and other nursery products).

The Cowichan Agricultural Area Plan estimates that the area includes a total of approximately 7,630 ha of food producing farm land.[139] This Agricultural Plan indicates that, to achieve 45% food security, the total amount of farm land in production would have to reach 17,977 ha. This means that the amount of farm land being used to produce food needs to more than double (from 7,630 ha to 17,977 ha) to achieve the region's food security target (Figure 3.13).

FIGURE 3.13: Area in farm production versus food production target



Sources: BC Ministry of Agriculture and Lands, 2008. Cowichan Valley Regional District Agricultural Overview, Cowichan Agricultural Area Plan, Vision, Goals and Objectives, 2009.

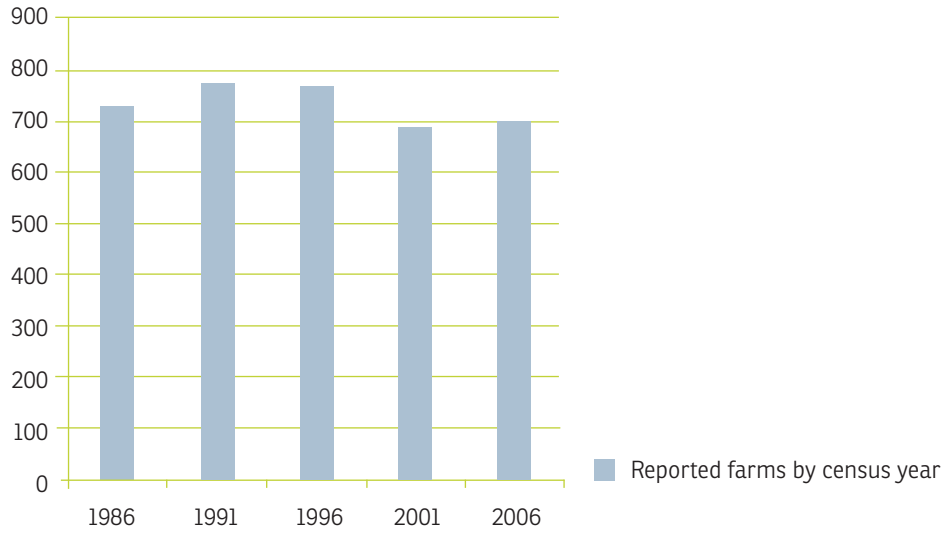
138 Ministry of Agriculture and Lands, 2008.

139 Cowichan Economic Development Commission, 2009.

The 2006 Census of Agriculture indicates that there are 700 farms in the Cowichan Region. The number of reported farms has remained fairly consistent since 2001, but has declined by more than 10% since the 1996 census (Figure 3.14).

The District of North Cowichan is home to a large percentage of the region's reported farms (55%), with most of the balance located in the South Cowichan area (28%) – including Cobble Hill, Cowichan Bay and Shawnigan Lake – and Saltair and on the Gulf Islands (12.5%).[140] This breakdown largely mirrors the location of the region's most fertile and arable land: on the east coast of the region, in the low elevation and floodplain areas.

FIGURE 3.14: Reported farms by census year, 1986 to 2006



Source: BC Ministry of Agriculture and Lands, Cowichan Valley Regional District Agricultural Overview, 2008.

The actual number of farms operating in the region may be significantly higher than the census data.[141] Some farmers prefer not to report their farming operations to avoid quota or supply management restrictions. Also, urban farming is an emerging trend that has yet to be properly accounted for.[142]

140 Cowichan Economic Development Commission, 2009.

141 Judy Stafford, Cowichan Green Community, personal communication, 2009.

142 Judy Stafford, Cowichan Green Communities, personal communication, 2009. For more information, see 2009 CVRD Issues and Opportunities, Phase 1 Discussion Paper.

An indication of the scope of unreported farms can be found in a 2000 study of small scale farming in South Cowichan. This study found that 10% of farm land in the South Cowichan sub-region was being used to grow food (including non-quota poultry and egg production) strictly for the benefit of family and friends.[143] A new Food Security Mapping Project being conducted by Cowichan Green Community may provide a more complete summary of farm operations.

Farm Size and Productivity

Indicator and Measures

Statistics Canada's Census of Agriculture data records farm size. Productivity is measured in farm receipts (farm revenues), which are also tracked using census data.

The Ministry of Agriculture and Lands monitors the number of reported farms in operation and the total hectares they are farming. However, due to the reluctance on the part of some farmers to be counted, this under-represents the number of farms. Also, direct sales at farm gates and at farmers' markets are not tracked, resulting in an incomplete picture of total farm receipts.

Findings

The average farm size in the region has been decreasing steadily for at least the past 20 years. In 1986, the average farm size was 31.2 ha; in 2006 it was 16.5 ha (a decline of 50%). Throughout this time, the majority of farms remained less than 52 ha in size, although there has been a slight increase in mid-sized farms (52–161 ha) (Figure 3.15).

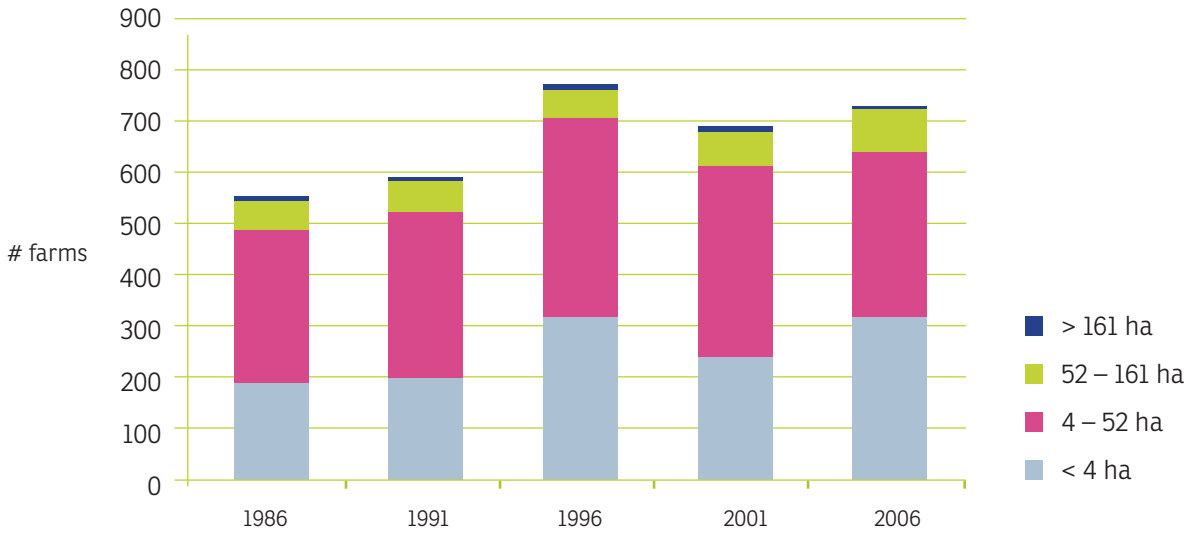
Despite the overall decrease in farm size, total farm gate sales increased by almost 50% between 2000 and 2005, and by 90% since 1986 (Figure 3.16).[144] In other words, farms are becoming smaller and more intensely productive. The average revenue per hectare increased from $1,467 in 1986 to $4,114 in 2005, a 280% increase. This increase in intensity may be partially attributable to more land under irrigation (each added hectare of irrigated land can displace 3+ hectares of non-irrigated land[145]).

143 BC Ministry of Agriculture and Lands, Small Scale Farming in South Cowichan Valley, 2000.

144 Cowichan Economic Development Commission, 2009.

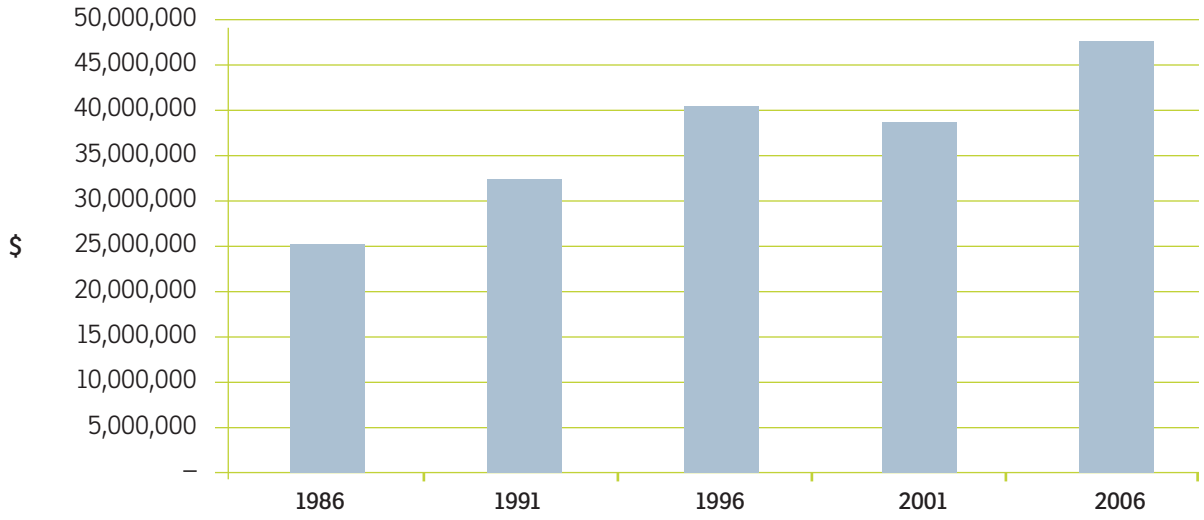
145 Cowichan Economic Development Commission, 2009.

FIGURE 3.15: Farm size, CVRD 1986–2006



Source: BC Ministry of Agriculture and Lands, Cowichan Valley Regional District Agricultural Overview, 2008.

FIGURE 3.16: Total Farm receipts, CVRD 1986–2006



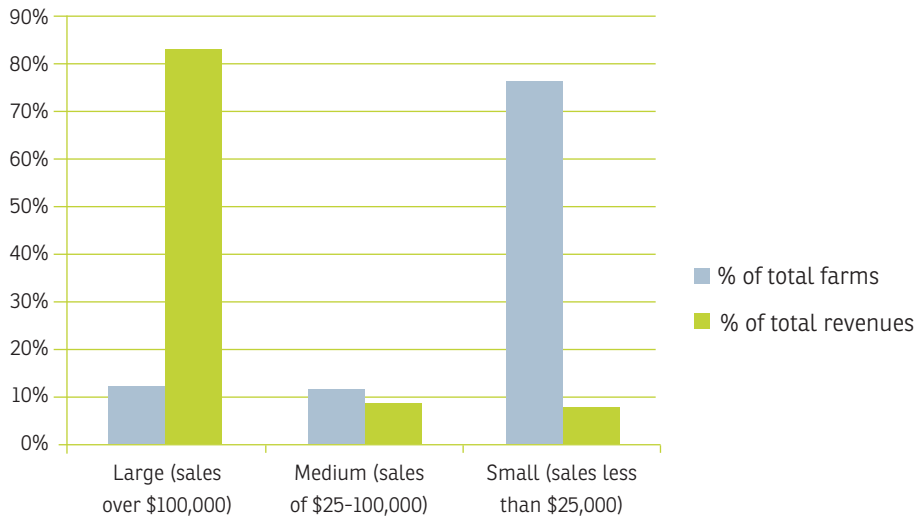
Note: Figures are reported in previous year dollars (e.g., 2006 is in 2005 $).

Source: BC Ministry of Agriculture and Lands, Cowichan Valley Regional District Agricultural Overview, 2008.

The vast majority of the region's farm revenues (83%) are generated from large-scale farms (sales over $100,000) which represent roughly 12% of all farms. Many of these high output farms are commodity producers who sell their product globally through formal marketing agencies and auctions.[146]

Almost in direct contrast, medium-scale/developing farms (sales of $25,000-$100,000) and small-scale farms (sales under $25,000) make up 84% of all farms, and generate 17% of revenues (Figure 3.17). Smaller farmers tend to sell most of their products directly to local consumers and retailers (only one in five uses formal marketing agencies), and almost half (40%) rely entirely on selling their products literally at the farm gate (Figure 3.18). [147]

FIGURE 3.17: Percent of total revenue generated by farm size in 2006

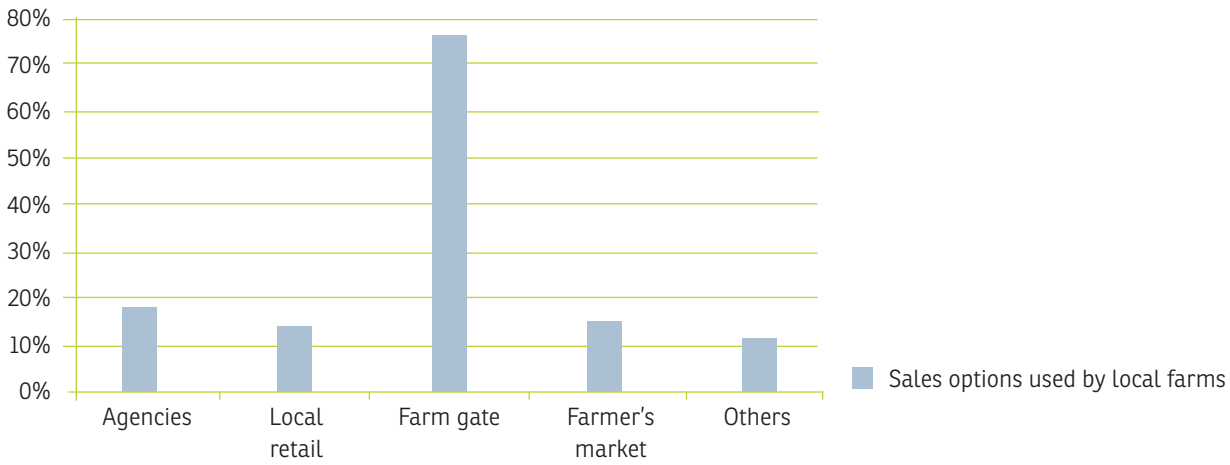


Source: Cowichan Economic Development Commission, State of the Agricultural Industry, 2009.

146 Cowichan Economic Development Commission, 2009.

147 BC Ministry of Agriculture and Lands, Small Scale Farming in South Cowichan Valley, 2000.

FIGURE 3.18: Methods of selling agricultural goods – sample of 72 South Cowichan farms



Source: Ministry of Agriculture and Lands, Small Scale Farming in South Cowichan Valley, 2000.

Crop/Livestock Diversity

Indicator and Measures

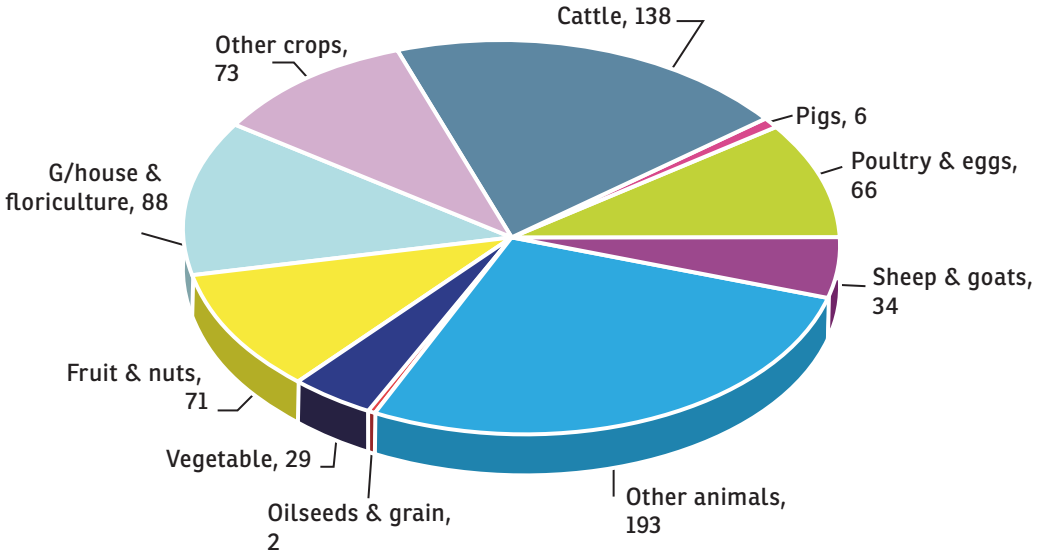
Statistics Canada tracks the variety of crops and livestock in production in its Census of Agriculture. Crop data is available as number of farms and total hectares, while information about livestock is reported as number of farms and number of heads of livestock, making it somewhat difficult to compare these types of production. Also, some farms produce both crops and livestock, so it is not possible to extract distinct totals in these areas of production.

This census data likely does not fully reflect the full range of agricultural activities taking place in the region. This is due to a significant number of farmers who choose not to be reflected in census data, as well as an increasing interest in urban or backyard farming. Also, food production from the sea and forests is not presently tracked.

Findings

Of the 700 reported farms in the region, approximately 47% are primarily involved in livestock operations, and approximately 37% are primarily involved in crop operations (Figure 3.19).[148] Many farms produce a combination of crops and/or livestock; a study of small scale farming in South Cowichan found that two-thirds of all farms (66%) are mixed farm operations.[149]

FIGURE 3.19: Livestock and crop major production categories (2006)



Source: Cowichan Agricultural Plan, State of the Industry Report, 2009.

The vast majority of crop operations (90%) are comprised of field crops[150] , although the production of fruits, berries and nuts[151] has risen from 1% to 3% over the past 20 years. This is accounted for largely by grape growing for the wine industry (grape production has grown from 1 ha in 1986 to 75 ha in 2006), as well as an increase in blueberry production (3 ha in 1986, 15 ha in 2006). The total area of cropland under production rose between 1986 and 2001, but shrank between 2001 and 2006 (Figure 3.20).

Vegetable production dropped from a high of 6.6% in 1996 to 1.2% in 2006.

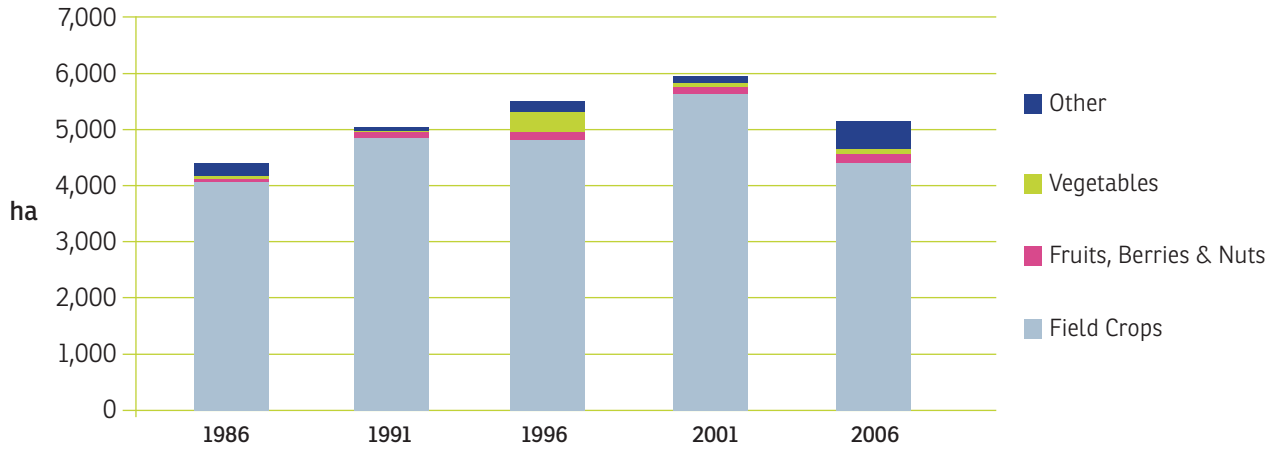
148 Cowichan Economic Development Commission, 2009.

149 BC Ministry of Agriculture and Lands, Small Scale Farming in South Cowichan Valley, 2000.

150 E.g., oats, alfalfa, rye, potatoes, hay, flaxseed, sunflowers.

151 E.g., apples, pears, plums, cherries, peaches, apricots, strawberries, raspberries, cranberries, Saskatoon berries, hazelnuts.

FIGURE 3.20: Crop land, CVRD 1986–2006



Note: "Other" includes crops not individually reported for confidentiality reasons.

Source: BC Ministry of Agriculture and Lands, Cowichan Valley Regional District Agricultural Overview, 2008.

Livestock operations include beef cattle, dairy cattle, chickens, turkeys, eggs, pigs, sheep, goats and honey. Predominantly non-food livestock includes horses, llamas, alpacas and rabbits. In 2006, the Cowichan Region accounted for 91% of all turkeys, 46% of all dairy cows, and 55% of all goats on Vancouver Island.[152]

The 2009 State of the Agriculture Industry report identifies a disturbing trend that has the potential to further compromise the region's ability to reach its food security goal. "The livestock industry is in a state of decline – especially ruminant livestock – dairy, beef and sheep. This is due to a combination of factors including increasing feed and fertilizer costs as well as significant increases in slaughter costs. Dairy production has also moved out of the area in recent years, as quota has become more transferable. This trend is disturbing because a large portion of the land base in the Cowichan Valley is only capable of producing forages. Also, the livestock industry has contributed greatly to helping maintain the agricultural infrastructure of the area."

A 2000 report on small scale farming in South Cowichan pointed to another troubling trend. It identified a key limitation to the growth of small scale livestock production as a "lack of auction and processing facilities."

152 Ministry of Agriculture and Lands, 2008.

The number of certified organic farms has risen in the past few years, from 6 farms in 2001 to 16 farms in 2006. Most of these grow fruits, vegetables or greenhouse crops. Greenhouse production has tripled in the past 20 years, from 14,874 m^2 in 1986 to 47,101 m^2 in 2006.

Summary

Agriculture is clearly a thriving and valuable industry in the Cowichan Region. The availability of arable land, coupled with an abundance of small-scale farming (characterized by small acreages, high-intensity production, crop/livestock diversity and direct sales to local consumers and retailers) appears to offer the necessary ingredients to achieving regional food security objectives.

However, current rates of reported productivity fall short of food security targets. Key barriers to achieving these targets include: access to irrigation water (and natural constraints on available water volumes) and skilled labour, an absence of processing and distribution facilities, high land prices, and restrictive food quotas.

Run-off from agricultural operations is contributing to water pollution, but there is no data on the extent of agricultural pollution or the steps being taken to reduce it.

Missing Information

There are several aspects of agriculture and food security that could not be adequately addressed in this report. Items which could be included in future such reports if data were available include the following.

> Water supply for agriculture: A changing climate means more extreme weather events (droughts, heat waves, floods) that can alter how and what kinds of food can be grown, the kinds of pests and diseases that growers will have to contend with, and the availability of fresh water. As of 2008, about 2,465 ha are irrigated in the Regional District.[153] Agricultural capability maps indicate that over 9,400 ha could be improved to prime (Class 3 or better) with irrigation – an increase of just under 7,000 ha. Data on groundwater availability are limited, and better information is required on how water supplies might be affected by climate change, and how the increased withdrawal of water for irrigation might affect adjacent ecosystems.

> Agricultural pollution: Run-off from agricultural operations is contributing to water pollution, but there is no data on the extent of agricultural pollution or any steps being taken to reduce it. The Ministry of Agriculture has been working with some local farms to implement their Environmental Farm Planning approach, which promotes stream bank buffers and other environmentally sustainable farm management practices. The South Cowichan Water Study program has identified this as an area of further study over the next few years in that portion of the region.

153 Ehrler-Limousin, 2009.

- Food processing capacity: Lack of local food processing capacity has been identified as an issue but there is no data to support clear reporting on progress (or lack of progress) to providing the necessary facilities.
- Food quotas: Supply-management quotas have been identified as a key barrier to achieving food security. These quotas may prevent local producers from meeting local demand. Further examination of this issue is warranted, and could begin with an assessment of existing quotas and how they relate to food security targets.
- The viability of farming: Small-scale farmers play a vital role in contributing to regional food security. Issues affecting their long-term viability include high land prices and unsustainably low incomes. Related issues include food distribution challenges and access to larger markets, and the availability of skilled labour. Presently, little data exists to provide a more complete understanding of these challenges.
- Urban agriculture: Many people have become interested in producing food at home or in community gardens. This provides an important contribution to the local food supply, but no data are available to report on this activity.
- Productive agricultural land within/outside the ALR: At this time, there is no accurate information about the total land area being farmed in the Cowichan Region (ALR and non-ALR), or what is being grown on that land. Current estimates do not include urban farms and farming operations taking place "under the radar."[154] The Cowichan Region's 2009 State of the Agriculture Industry report indicates that, of the 32,830 ha of arable land in the region, only 35% are in production.[155] This report also states:

  "5.1% of the land in the Cowichan Valley is in the ALR. Only 3.3% of the land base in the region is actively farmed – presumably, most is within the ALR – so a significant portion of the ALR is not actively farmed."[156]

- Food security: future reporting may want to compare actual levels of food production to the regional objectives, and report on some of the indicators highlighted in the 2010 Cowichan Food Security Plan.[157]

154 Judy Stafford, Cowichan Green Communities, personal communication, 2009. For more information, see 2009 CVRD Issues and Opportunities, Phase 1 Discussion Paper.

155 Cowichan Economic Development Commission. 2009.

156 Cowichan Economic Development Commission. 2009.

157 This plan is available at: www.cowichangreencommunity.org/sites/default/files/CowichanFoodSecurityPlanFinalDraft.pdf

References

Agricultural Land Commission Statistics. www.alc.gov.bc.ca/alr/stats/Statistics_TOC.htm. Accessed December 30, 2009.

Cowichan Economic Development Commission. 2009. Cowichan Region Area Agricultural Plan—State of the Industry Report.

Cowichan Green Community. 2008. Cowichan Food Security Plan.

Ehrler-Limousin, Arnold Harasymchuk. 2009. From the Ground Up—Issues And Opportunities: Phase 1 Discussion Paper.

Haddow, Wayne. 2001. Consumers are King. FarmSpeak Conference. Cited in A Baseline Assessment of Food Security in BC's Capital Region (2004).

Ministry of Agriculture and Lands. 2008. Cowichan Valley Regional District Agricultural Overview.

Municipality of North Cowichan. 2008. Food Security and Agricultural Enhancement: Discussion Paper.

Scott, Ramona. 2004. Agriculture and Conservation: Striving for the Best of Both in One World. Presentation to 2004 Canadian Food Security Conference on behalf of The Land Conservancy of BC.

Westland Resource Group. 2005. Water Facts. Report Prepared for Cowichan Valley Regional District, BC Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper Corporation, Cowichan Tribes and Pacific Salmon Commission.

3.3 Drinking Water Supply

Introduction

Drinking Water in the Cowichan Region

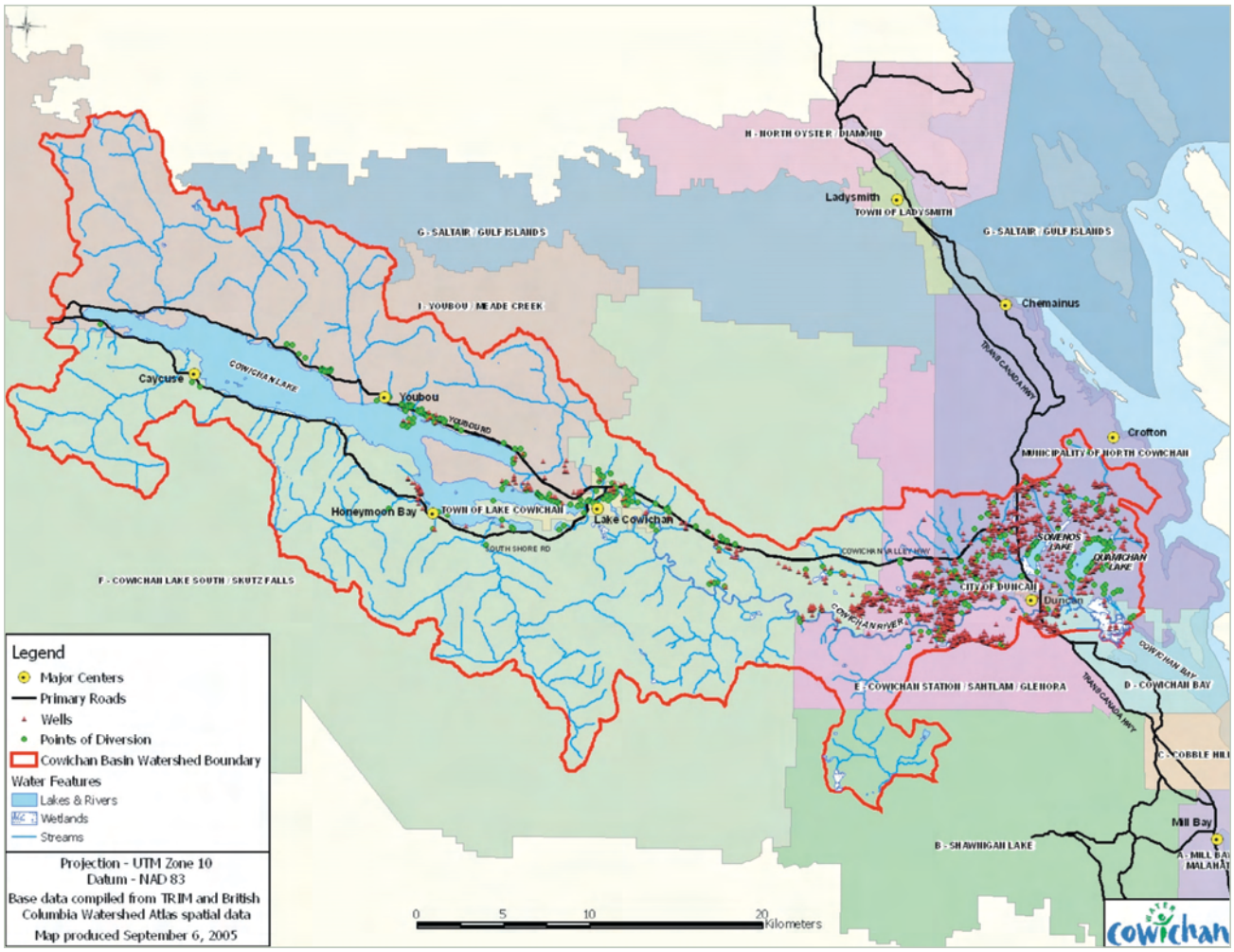
Drinking water (also known as potable water) is used for a variety of household purposes such as drinking, cooking, washing dishes, and showering. Potable water (i.e., water from the same source that supplies drinking water pipes) is also used for many non-drinking purposes, such as flushing toilets, washing cars and irrigating lawns. Business and industry also need water for a variety of activities and processes. The over-use of water for such human purposes can have serious ecological consequences. For example, streams can run dry and be unable to support fish and other aquatic species, and wetlands can no longer support the same types of plants and animals.

In the Cowichan Region, water is either drawn from groundwater sources (wells) or from surface water sources (lakes, creeks). Regional, local and First Nations governments supply much of the water used by CVRD residents and businesses, with the balance supplied by approximately 25 private operators and extracted via private wells (Appendix B). While the total number of private wells in the region as a whole is not known, the Ministry of Environment wells database identifies more than 1,300 wells in the Cowichan Basin, with more than 530 water licenses in that area (Figure 3.21). In 2004, there were 667 water licenses in the Cowichan and Koksilah watersheds[158]. Catlayst Paper was the largest licensee with 83% of volume licensed.

See Section 2.6 for more information on water quantity and quality in the Cowichan Region.

158 LGL, 2005.

FIGURE 3.21: Location of wells and points of diversion in the Cowichan Basin



Source: Cowichan Basin Water Issues, Final Report, 2005.

The supply of drinking water is a major concern for the Cowichan Region. Despite this region's often wet winters, water is a limited resource – especially during dry summers. As the population of the region increases, there will be additional pressures on water supply. Climate change is also expected to further limit water supply, as reduced snow packs (see Section 1) lessen the run-off to lakes and creeks during the spring and summer. Concern regarding groundwater levels and aquifer supply is also on the increase, with some well users fearing that new draws on aquifers will exceed their capacity to provide drinking water for all users.

Concerns about drinking water cannot be isolated from the use of water for other purposes: agriculture, ecosystem needs (fish and other aquatic populations), industrial use, and water-based recreational activities. The Cowichan Valley Regional District is addressing some of these issues through studies such as:

> The South Cowichan Water Plan Study[159]: a preliminary study of the region's current water resources and needs (with estimates of future needs), and a water management framework. This will lead to a Water Management Plan for the areas of Mill Bay/Malahat, Shawnigan Lake, Cobble Hill, and Cowichan Bay.

> The Cowichan Basin Water Management Plan[160]: a comprehensive review of water supply issues in the Cowichan Basin, with recommendations on ways to provide adequate water for human and ecological needs now and into the future. One outcome of this Plan has been the formation of a Cowichan Watershed Board to guide the implementation of the Cowichan Basin Water Management Plan.

Concerns about water quantity are coupled with concerns about water quality. Both surface water and groundwater sources are vulnerable to contamination from pollutants. Water purveyors (public and private) are responsible for testing and treating (if necessary) drinking water before it is delivered to households. Therefore, water users on these systems can generally be assured of the quality of the drinking water, unless boil water advisories are issued. For residences served by private wells, there are always fears about contamination from nearby sources such as leaking septic fields. In coastal areas, sea level rise, particularly in conjunction with aquifer draw-down, could lead to salinization of the water supply, rendering it undrinkable.

Measuring Drinking Water

It would be ideal to be able to measure the total and per capita amount of drinking water consumption from all sources across the region. However, as noted above, there are many different water systems throughout the Cowichan Region, both public and private, and most homes in the region are not metered. This makes it virtually impossible to track region-wide water consumption with any accuracy. Only partial information was available for inclusion in this report.

It would also be helpful to be able to track the water levels of the region's aquifers, in order to better understand whether the region is using groundwater faster than it can be replenished by precipitation. Again, these data are only available for parts of the region.

159 WorleyParsons, 2009.

160 Westland Resource Group, 2007.

This report does not include any information on the quality of drinking water. Data on boil water advisories is available, but it was not felt to be a useful indicator. The CVRD is gradually replacing problematic water sources, or taking over privately run small water systems, to ensure that drinking water quality remains high, and the boil water advisories largely indicate where this has not yet happened.

Water Consumption

Indicator and Measure

This indicator is a measurement of the quantity of water consumed. The indicator includes the total amount of water consumed (for household, industrial/commercial, and agricultural purposes), as well as the per capita amount. This is important to know, since, even if per capita use is dropping, the overall amount consumed could increase as the population increases, stressing limited water supplies further.

Data on water consumption is variable across the CVRD. Where there are municipal water systems (as for Ladysmith, Lake Cowichan and Duncan), monthly water consumption data are available.

All CVRD-operated water systems are automatically on Stage 1 watering restrictions from June 1 to October 31 of each year, limiting the number of watering days and hours. In drought conditions, additional water use restrictions may apply.[161]

Findings

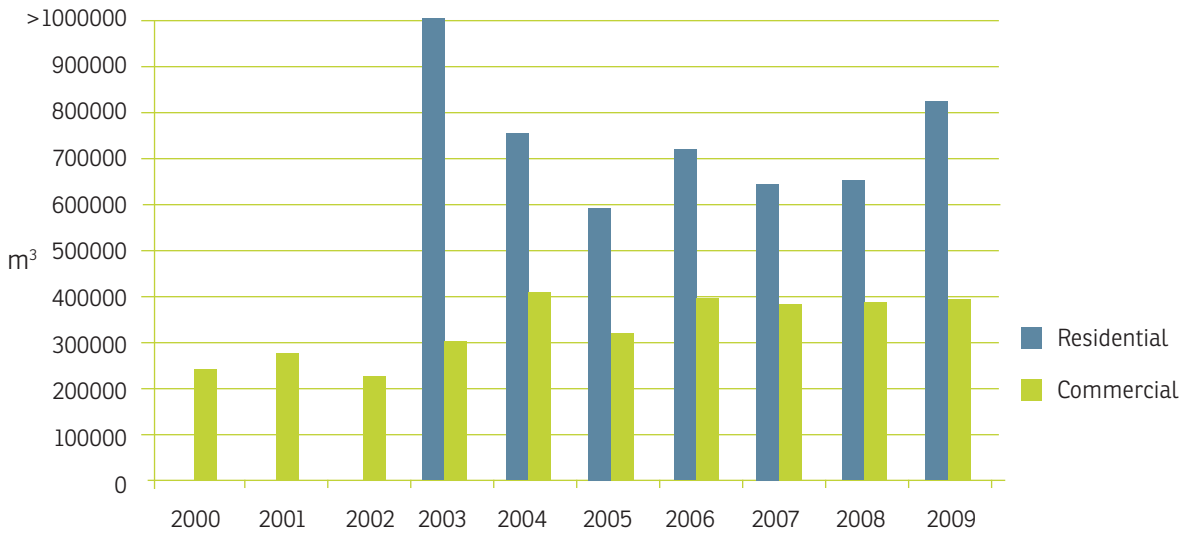
Water consumption data were available for three communities: Ladysmith, Duncan and Lake Cowichan.

Town of Ladysmith

Ladysmith is the first community in the region to have all water users on meters. All commercial operators were metered as of the mid-1990s. As of 2002, all residential users were also metered, and charging for water use based on metered amounts began in 2005. Ladysmith data show annual usage for commercial and residential users (Figure 3.22).

161 CVRD Watering Regulation Summary Table, cvrd.bc.ca/documents/Engineering%20Services/Utilities/Water/Forms/WateringRegTable.PDF

FIGURE 3.22: Town of Ladysmith water consumption 2000–2009



Source: Town of Ladysmith.

For 2003, the first year meters were fully operational, residential consumption was 2,750,000 m^3 annually. This dropped to 750,000 m^3 the following year, even though water usage was not being charged by consumption, and further yet in 2005 (to 580,000 m^3) when consumption charges were first introduced, indicating that metering helped to raised awareness of water conservation. Overall, water usage since 2002 has declined by 23%, in spite of a population increase of 17%.[162] However, total residential usage has generally increased over the past five years. For 2009, the per capita consumption (residential only) was 313 m^3 per person.

Commercial usage has been relatively stable for the past five years.

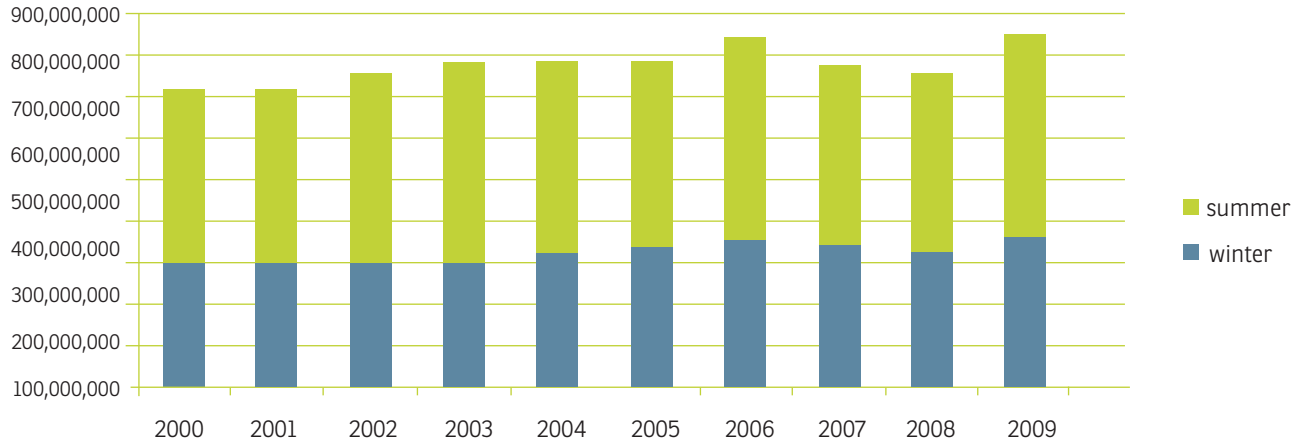
City of Duncan

The City of Duncan tracks monthly overall water consumption. Figure 3.23 below shows water consumption from 2000 to 2009, for winter water use (January–March and October–December) and summer use (April–September). Summer water use is typically higher as it includes lawn and garden watering.

The City of Duncan is retrofitting residences with water meters over the next few years.

162 Joe Friesenham, Director of Public Works, Ladysmith, personal communication, 2009.

FIGURE 3.23: City of Duncan water consumption 2000–2009



Source: City of Duncan

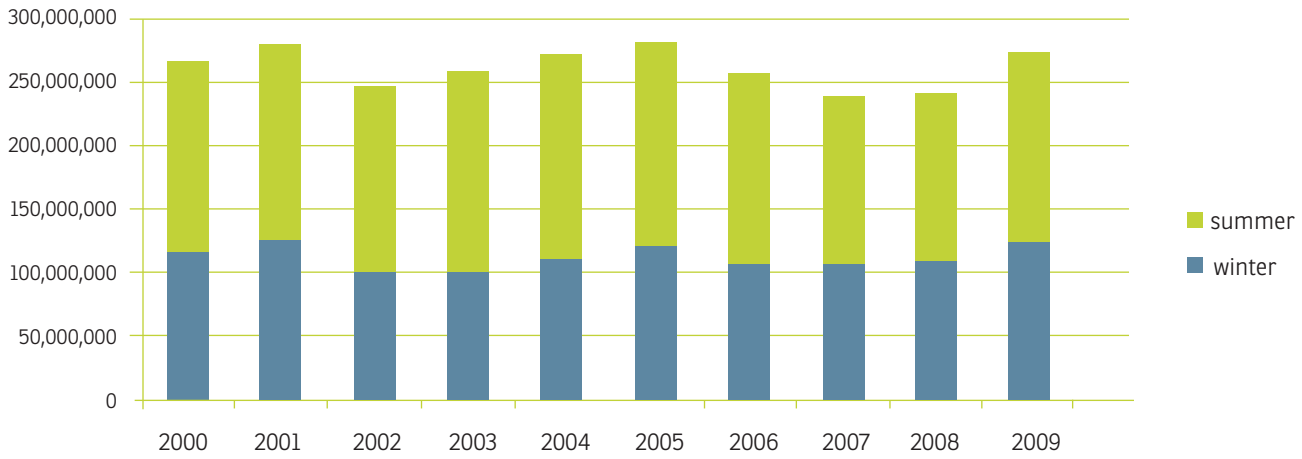
Total water consumption has gradually increased over the past decade, although amounts vary in relation to the summer weather. However, the population of Duncan rose by only 3% between 2001 and 2006, yet the winter water consumption rose by almost 15% during this same period.

Town of Lake Cowichan

The Town of Lake Cowichan tracks daily and monthly water consumption. Figure 3.24 shows the community's total water consumption over the past decade, for winter use (January–March and October–December) and summer use (April–September). As in Duncan, water use during the six months including summer is higher due to outside watering.

Most of Lake Cowichan's commercial operations are metered. The Town of Lake Cowichan is currently installing meters for all water users, and all residences will be metered by the end of 2010. The process of installing meters is helping to identify more leaks, as each meter's backflow valve pressurizes each house.

FIGURE 3.24: Town of Lake Cowichan water consumption 2000–2009



Source: Town of Lake Cowichan.

Water consumption data are variable as the Town has had significant issues with leaky pipes, which it has been working to fix. In general, water consumption has been decreasing since 2005, largely due to fixing leaks in the system. In 2009, there was a big leak (half a million litres a day) that took a long time to locate, resulting in a spike in use. The Town of Lake Cowichan's population grew by 4.3% between 2001 and 2006.

Other Users

Industry is one of the most significant water users in the region. Catalyst Paper, for example, has a licence to use 240 million litres of water per day from the Cowichan River (although actual usage is lower, at approximately 150 million litres per day), which it pipes to the Crofton Mill. This is also the water source for the community of Crofton.

Summary

Having secure supplies of drinking water is essential to the people of the Cowichan Region, and the ability to provide reliable sources of drinking water shapes growth and development. Drinking water in the Cowichan Region comes from both groundwater and surface water sources, provided by public and private water purveyors as well as from individual wells.

Many of the region's residents are not on a metered water system, so it is hard to track use from households (as opposed to the water used by industry, business and agriculture, which may also be served by the same water source). As well, data on the consumption of groundwater by private wells are not available.
Three municipalities are moving towards water metering. Ladysmith now has full metering, and residential water use has declined considerably since meters were first installed, although it seems again to be on the rise. Water consumption in Duncan and Lake Cowichan is generally rising, and both communities are in the process of installing water meters. Water consumption varies by year, in part due to summer watering of lawns and gardens.

Missing Information

Information on groundwater use by private wells is very limited. Even in the Cowichan Basin, where more extensive studies have been conducted, information on the use of water from wells is poor. There is monitoring of the quantity of surface water taken by licensed water users, but no monitoring to ensure that groundwater extraction matched the permitted amount.[163]

References

BC Ministry of Environment. 2007. Environmental Trends in British Columbia: 2007. State of Environment Reporting. Victoria, BC. www.env.gov.bc.ca/soe/et07/

Westland Resource Group. 2005. Issues Report. Report Prepared for Cowichan Valley Regional District, BC Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper Corporation, Cowichan Tribes and Pacific Salmon Commission. September 2005.

Westland Resource Group. 2005. Water Facts. Report Prepared for Cowichan Valley Regional District, BC Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper Corporation, Cowichan Tribes and Pacific Salmon Commission. October 2005.

Westland Resource Group. 2007. Cowichan Basin Water Management Plan. Report prepared for Cowichan Valley Regional District, BC Ministry of Environment, Fisheries and Oceans Canada, Catalyst Paper Corporation, Cowichan Tribes and Pacific Salmon Commission. March 2007. cvrd.bc.ca/documents/Engineering%20Services/Environment/Cowichan%20Basin%20Water/CBWMP_29Mar07.PDF

WorleyParsons. 2009. South Cowichan Water Plan Study: A Preliminary Assessment of Water Supply & Needs Within the South Cowichan Region. Report Prepared for the Cowichan Valley Regional District. February 2009. www.cvrd.bc.ca/documents/Engineering%20Services/Utilities/Water/SCow%20WaterPlan%20FINAL-Feb09OCOMPRESSED.PDF

163 Louise Knodel-Joy, Sr. Engineering Technologist, Water Management, CVRD, personal communication, 2010.

3.4 Climate Change Mitigation and Adaptation

Introduction

Climate change is upon us. The 2009 Copenhagen climate conference update[164] states that "rapid, sustained, and effective mitigation is required to avoid dangerous climate change" and that "inaction is inexcusable."

In order to mitigate the effects of additional climate change, the amount greenhouse gases released into the atmosphere must be reduced. At the same time, steps need to be taken to adapt to the climate change that is already happening and is expected to become more pronounced in the coming years. Together, steps to mitigate and adapt to climate change are referred to as climate action.

Section 1 provides a description of the climate change impacts expected in the Cowichan Region.

Measuring Climate Action

Measuring Climate Mitigation Efforts

Efforts to mitigate climate change can be measured by tracking:

> Energy and emissions

- The use of fossil fuels as an energy source
- The use of "clean"[165] (low-carbon) energy sources
- Greenhouse gas emissions from buildings, transportation and waste management activities; and

> The availability of carbon sinks (that absorb carbon dioxide from the atmosphere).

Energy use and greenhouse gas emissions data are available through the provincial Community Energy and Emissions Inventory[166] (CEEI) which tracks energy use from buildings, transportation and waste in all BC communities. The 2007 CEEI Reports presents high-level estimated community energy consumption and greenhouse gas emissions from various sectors.

164 Climate Change Synthesis Report, Copenhagen, 2009. www.climatecongress.ku.dk/pdf/synthesisreport

165 Low carbon or carbon neutral sources of energy, such as solar or wind power.

166 toolkit.bc.ca/ceei

The province is currently working on updating and improving the data quality of the CEEI reports; however, revised data were not available at the time of writing. CEEI background material notes that

> *"As with most inventories, the level of accuracy depends highly on the completeness of the data sources and consistency in the methodologies applied... The CEEI Working Group will continue to work to improve data accuracy. As data improves, past reports will be updated and re-posted in order to provide a consistent method of comparison over time."*[167]

The 2007 CEEI Report User Guide provides additional information on accuracy and technical issues.

The 2007 CEEI data are limited, in that reporting was restricted to information that was available province-wide, and does not include, for example, energy and emissions related to oil-based home heating or wood stoves. However, the provincial nature of the data makes it easy to compare the results for the Cowichan Valley Regional District (CVRD) to other regional districts.

Measuring Climate Adaptation Strategies

Climate adaptation measures include actions taken to prepare communities for the expected impacts of flooding, drought, sea-level rise, and more intense wind- and rain-storms. These changes will create impacts throughout the region, including to industries such as agriculture, forestry, tourism, and fishing, and to infrastructure requirements. At this time there are no statistical measures of climate adaptation strategies, but this report lists some of the actions taking place with climate change needs in mind.

Adaptation measures will also require taking action to address expected population and social changes brought by global climate change, such as climate refugees from other countries. However, these matters are beyond the scope of this State of the Environment report.

167 www.env.gov.bc.ca/epd/climate/ceei/faq.htm

Energy and Emissions

Indicator and Measure

The Community Energy and Emissions Inventory (CEEI) tracks energy use from buildings and transportation, and estimates emissions from these sources as well as from solid waste and deforestation. Emissions are measured as "carbon dioxide equivalent" (CO_2e), as some sources such as methane have a far greater greenhouse gas impact than carbon dioxide.

> The buildings sector is subcategorized into residential, commercial and industrial buildings. Each subcategory includes the number of connections, the amount of actual energy consumed (e.g., electricity in kWh and natural gas in GJ), and the resulting carbon dioxide equivalent (CO_2e) totals for each building subcategory, as well as a CO_2e subtotal for the sector.

> The on-road transportation sector is subcategorized into several passenger and commercial vehicle classes. Each subcategory includes an estimate of the amount of fuel used (e.g., gasoline, diesel fuel, and mobile propane), and the resulting CO_2e totals for each vehicle class, as well as a CO_2e subtotal for the sector. Emissions from rail, marine and air travel are not included in the 2007 data.

> The solid waste sector includes the estimated mass of waste disposed of by local governments at community and/or regional landfill(s), with the associated CO_2e (methane) net of any known landfill gas flaring, methane capture, etc.

> The land-use change (deforestation) sector includes the estimated amount of CO_2e from the clearing of forests for urban development and agriculture. For the purposes of greenhouse gas accounting, deforestation is defined as "the direct human-induced conversion of forested land to non-forested land." This measure looks only at deforestation, and does not consider afforestation activities. This data is provided only at the regional district level.

The Cowichan Valley Regional District and some of its member municipalities have also undertaken inventories of their own (corporate) energy and emissions.

Findings

Community Energy and Emissions Inventory (CEEI) Results

Table 3.3 and Figure 3.25 show that in the Cowichan Region, on-road transportation consumes more energy than buildings (55% compared to 45%). However, when comparing the greenhouse gas emissions from these sources, the contribution of transportation is more than six times that from buildings (Figure 3.26). This is because electricity is a major source of energy for buildings, and in British Columbia most electricity comes from "clean"[168] (hydro) sources (the 2007 electricity emissions factor used is 0.022 tonnes/kWh.[169]).

In the Cowichan Valley, deforestation is also identified as a significant source of greenhouse gas emissions (9%). Deforestation has been identified globally as one of the largest contributors to overall greenhouse gas emissions, and as a primary area for action to mitigate climate change.[170]

Total emissions from all sectors are 427,398 tCO_2e.

TABLE 3.3: Energy use – buildings and on-road transportation

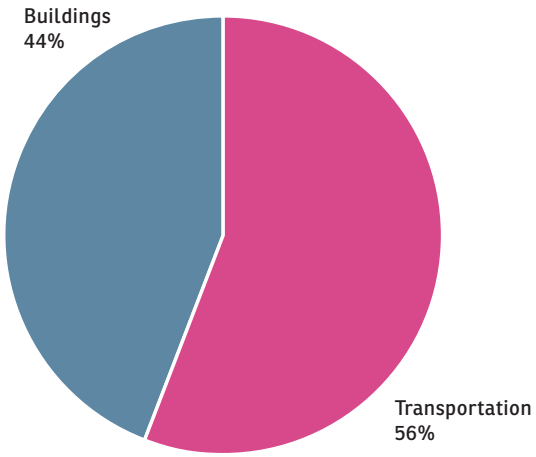
Buildings	(Energy GJ)
Residential	2,291,368
Commercial	1,110,984
Industrial	104,292
Total	3,506,644
On-road transportation	Energy (GJ)
Small cars	754,182
Large cars	367,023
Light trucks, vans, SUVS	2,154,185
Commercial vehicles	897,786
Tractor trailer trucks	123,607
Motor homes	86,746
Motorcycles/mopeds	28,688
Bus	90,314
Total	4,502,531

168 Hydro-electric power is considered a "clean" source of energy as it is a low-carbon form of energy, unlike, for example, electric power from a coal-fired power station. However, it should be noted that British Columbia imports power from Alberta and the United States during peak periods, and so not all electricity comes from "clean" sources.

169 CEEI Reports User Guide, March 2009.

170 International Panel on Climate Change, Contribution to Group III: Summary for Policymakers, 2007. www.ipcc.ch/pdf/assessment-report/ar4/wg3/ar4-wg3-spm.pdf

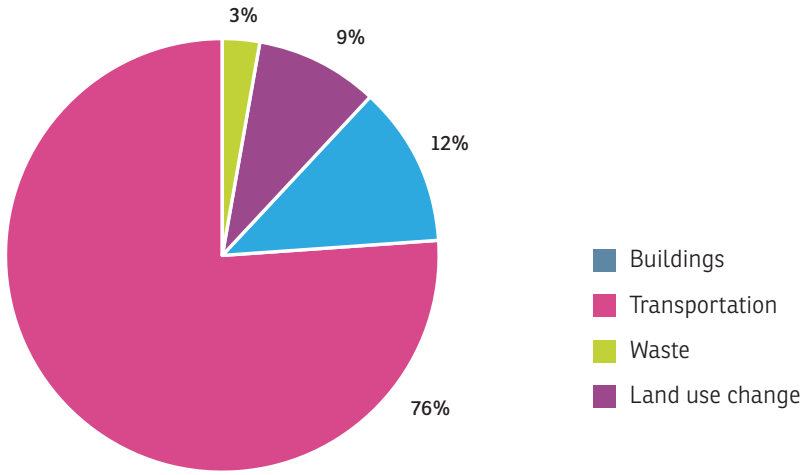
FIGURE 3.25: Energy use by sector, 2007



Source: Community Energy and Emissions Inventory, 2007

www.env.gov.bc.ca/epd/climate/ceei/pdf/2007Cowichan-Valley-rd.pdf

FIGURE 3.26: Emissions by sector, 2007



Source: Community Energy and Emissions Inventory, 2007

www.env.gov.bc.ca/epd/climate/ceei/pdf/2007Cowichan-Valley-rd.pdf

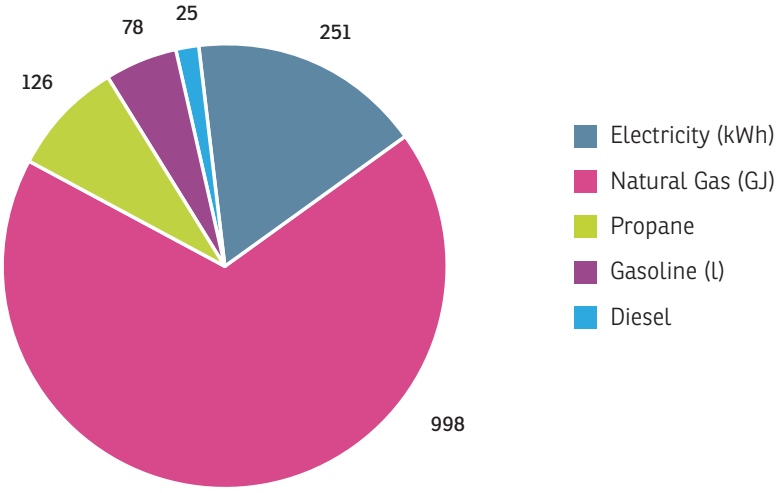
Cowichan Valley Regional District Emissions

The Cowichan Valley Regional District and its member municipalities have signed the Climate Action Charter[171], pledging to reducing both corporate greenhouse gas emissions (resulting from local government operations) and community emissions (from the community as a whole), and becoming carbon neutral in respect to their operations by 2012. Figure 3.27 shows the CVRD's corporate emissions from a variety of fuel sources. Natural gas is by far the largest source of corporate emissions from these sources. The total emissions from the CVRD corporate activities are 1,478 tCO_2e. This is less than 0.4% of the total (community) emissions for the region, meaning that, while the CVRD must lead the way in reducing emissions, community emissions remain by far the largest contributor to climate change.

If the CVRD were to buy offsets for its corporate emissions at $25 per tonne (to become "carbon neutral),[172] this would cost almost $37,000 per year, based on 2007 activities.

Under the 2008 Local Government (Green Communities) Statutes Amendment Act, municipalities are required to have specific and quantifiable emission targets in their Official Community Plans by May 2010 (the Regional District has until May 2011 to prepare emissions targets for the region).

FIGURE 3.27: Emissions, CVRD 2009



Note: Units are tCO2e.

Source: CVRD, 2009.

171 www.cd.gov.bc.ca/ministry/docs/climate_action_charter.pdf

172 $25 per tonne is the amount that provincial facilities will pay to offset carbon emissions in 2010. Local governments are not currently legally required to pay carbon offsets.

Emissions by Municipality

The City of Duncan has prepared a 2008 Report on Energy and Emissions.[173] This report found that overall corporate (municipal operations) energy consumption in 2007 was 14,946.6 GJ, and emissions were 332.4 tCO_2e. Categories include city-owned facilities, Public Works and Fire Department vehicles, water and wastewater systems, street and signal lighting, and solid waste generated at city-owned facilities. Corporate emissions increased by 3.8%, or 12.6 tCO_2e, from 2007 to 2008. The report identified targets for inclusion in the Official Community Plan (suggesting a 33% reduction by 2020 and 80% by 2050, relative to 2007 levels), and a series of strategies to reduce energy use and emissions.

The Town of Lake Cowichan has also produced a detailed Report on Energy and Emissions[174] (2009). This report found that total emissions for corporate operations in 2007 were 205.2 tCO_2e. The top greenhouse gas emitters for the Town of Lake Cowichan operations are the vehicle fleet (49%) and facilities (45%).

Carbon Sinks

Natural ecosystems – such as oceans, forests, wetlands and grasslands – absorb carbon dioxide from the atmosphere and so can act as "carbon sinks", making carbon dioxide at least temporarily unavailable to contribute to atmospheric warming. Management strategies and natural processes within ecosystems can either result in additional storage or in release of carbon dioxide over time. For example, forest fires can result in significant amounts of carbon dioxide being released back into the atmosphere. Similarly, harvesting high biomass (i.e., large structured) forests, especially those that have been undisturbed for many hundreds of years and have large amounts of carbon tied up in their soils, can result in a significant release of carbon back into the atmosphere.[175]

The science behind how much carbon ecosystems can absorb and store is imperfect and complex, and depends on issues such as age, productivity, tree species and wetland type, as well as their natural pathways, and the impacts of management systems. There are few simple measures of this process available currently, but undisturbed forested ecosystems such as those present on the west coast of the CVRD can store significant amounts of carbon for very long periods. Ecosystems with higher natural disturbance rates (e.g., fires), especially in productive sites such as those on the east side of the CVRD, can also be managed to sequester a maximum potential amount of carbon. Strategies for taking account of carbon in management decisions for any ecosystem are in their formative stages. However, this measure has been included in this report, as it is

173 City of Duncan, 2008.

174 Town of Lake Cowichan, 2009.

175 Holt, 2009.

an item of increasing interest to communities, particularly given the potential to use ecosystems to reduce the currently dangerous build-up of carbon dioxide into the atmosphere. There are also potential synergies to be gained in future, with the possibility of using "carbon offsets" from ecological assets to contribute to both the broader mitigation of climate change and ecological adaptation to the changes that are already destined to occur.[176]

Indicator and Measure

This report provides a baseline of information on the amount of forest and wetland cover in the region (as discussed in Section 2.1). Recently logged forest land has not been included in this table on the assumption that any remaining trees do not contribute significantly to carbon absorption.

Findings

Table 3.4 indicates that there are 222,491 ha of forest/wetland in the Cowichan Region, or about 62.6% of the landbase.

TABLE 3.4: Carbon sinksG

Land Use Type	Area(ha)	Percent
Young Forest	156,234	43.9
Old Forest	65,302	18.4
Wetlands	955	0.3
Total	222,491	62.6

176 The 2010 Provincial Budget promised to introduce a Carbon Offset Credit program for reforestation. www.bcbudget.gov.bc.ca/2010/speech/2010_Budget_Speech.pdf

Climate Adaptation Strategies

As noted in Section 1, predicted major impacts to communities in coastal BC resulting from climate change include:

> Increased winter flooding in low-lying areas

> Summer water shortages resulting from drought and reduced snow-packs

> Increased damage from wind- and rain-storms

> Sea level rise and higher storm surges.

Indicator and Measure

Ideally, all parts of the region would have climate adaptation strategies to deal with the impacts most likely to be faced in that part of the region. In addition, land use zoning would identify (and prohibit construction within) areas subject to flooding or other hazards, and all infrastructure (e.g., stormwater pipes) would be designed to cope with expected increased levels of storm water flow and a rise in sea level.

As noted above, there are no statistical measures of adaptation at this time. However several plans and activities indicate that the Cowichan Valley Regional District is beginning to consider adaptation approaches.

Findings

Examples of strategies that address climate adaptation include the following:

> Flood Management: The winter of 2009-2010 saw considerable impact from flooding, especially in the lower Cowichan/Koksilah river flood plain. The City of Duncan, with a population of approximately 5,000, lies at the centre of the floodplain. The Cowichan Tribes has about 3,800 members, many of whom live on the floodplain. In addition to residential areas, there is urban and agricultural development in the floodplain, as well as significant and critical infrastructure. To date, land use planning has not controlled the development of houses and other critical infrastructure on the floodplain.

  The 2009 Lower Cowichan/Koksilah River Integrated Flood Management Plan[177] reviewed flood hazards on the lower floodplain, and prepared maps showing the degree of flood hazard. These were based on an increase of 1 m in the 200-year ocean level, with or without a change in the 200-year peak river discharges (at the time of writing, the flood management report has yet to be released, so maps are not included in this State of the Environment report). The flood management report suggests several strategies and actions to address flood issues.

177 Northwest Hydraulic Consultants, 2009.

- Drought management: The Cowichan Basin Water Management Plan considered the combined impacts of population growth and climate change, making several recommendations on ways to ensure an adequate drinking water supply for the future. A Water Management Plan for the South Cowichan (Mill Bay/Malahat, Shawnigan Lake, Cobble Hill, and Cowichan Bay) is also under development.
- Agriculture: A changing climate means more extreme weather events (droughts, heat waves, floods) that can alter how and what kinds of food can be grown, the kinds of pests and diseases that growers will have to contend with, and the availability of freshwater.
- Fisheries: The Pacific Fisheries Resource Council has prepared a backgrounder on climate change impacts[178] in the Cowichan River system, based on the work from the Cowichan Basin Water Management Plan.
- Energy resiliency: The Regional District is currently in the process of developing a Regional Energy Plan that will identify a range of energy-related policies and initiatives aimed at developing more energy resilient communities and providing a range of adaptation strategies.

Summary

The Regional District and its member municipalities, together with many groups and individual citizens, have recognized climate change as an issue that needs to be addressed. Some early steps have been taken to mitigate and adapt to climate change, but major region-wide strategic and sectoral approaches have yet to occur. This report provides a baseline for future climate action reporting.

Missing Information

There are many gaps in the data on climate action. For example, while data are available on fossil fuel use, there are no data sources on how much energy is being generated from "clean" energy sources such as solar or wind power. In addition, the Community Energy and Emissions Inventory (CEEI) does not provide trend data that show whether energy consumption (overall and per capita) is increasing or decreasing, and did not include some fuel sources such as heating oil and the use of wood stoves.

As noted above, the 2007 CEEI data are incomplete. The provincial government is working on updated inventories that will contain additional data. One data gap of concern for the Cowichan Region is marine transportation emissions, which contain many substances of air quality concern as well as greenhouse gases. The CVRD hopes to develop a more detailed emissions inventory in the near future.

178 www.fish.bc.ca/backgrounder-climate-change-adaptation-strategies-cowichan-river-basin

Data on carbon sinks in the region are incomplete, and do not provide a clear picture of the value of these sinks. For example, while the amount of data on forests and wetlands can be derived from available information, there is no conclusive information to date as to the relative value of older forests, younger forests, and wetlands as carbon sinks.[179]

Gaps in adaptation data are even more significant. The region and its member municipalities do not have comprehensive adaptation strategies, so it is not yet clear what activities should be taking place. However, some parts of the region have begun to address issues that are current and likely to worsen with climate change, such as winter flooding and water-supply shortages because of summer drought. Some research work is now underway to look at the sensitivity of the shoreline zone to sea level rise, also currently a data gap.

References

BC Ministry of Environment. 2007. Cowichan Valley Regional District Community Energy & Greenhouse Gas Emissions Inventory: 2007. www.env.gov.bc.ca/epd/climate/ceei/pdf/2007Cowichan-Valley-rd.pdf

City of Duncan. 2008 Report on Energy and Emissions. Unpublished Report.

Holt, R.F. 2009. Ecosystem-Based Management in the Great Bear Rainforest. Defence for Climate and Species. www.savethegreatbear.org/resources/Reports/climate_report_0309

Hyla Environmental Services. 2008. Data Requirements for Community Energy and Emissions Inventories in British Columbia. www.env.gov.bc.ca/epd/climate/pdfs/ceei-data-req.pdf

Northwest Hydraulic Consultants. 2009. Lower Cowichan/Koksilah River Integrated Flood Management Plan. Prepared for Cowichan Valley Regional District.

Province of British Columbia. 2009. CEEI Reports User Guide. www.env.gov.bc.ca/epd/climate/ceei/pdf/ceei-user-guide.pdf

Town of Lake Cowichan. 2009. Report on Energy and Emissions.

179 Several studies are underway.

PHOTO: ANDREW LEONG

3.5 Waste Management

Introduction

Waste Management in the Cowichan Valley Regional District

Waste management has traditionally meant the safe disposal of solid waste (garbage and recyclables) and liquid waste (sewage). The Cowichan Valley Regional District has set itself a long-term goal of Zero Waste, which means that it needs to start managing its waste streams very differently, as well as looking at reducing and recycling waste as well as recovering resources from its waste streams.

This is consistent with steps being taken by other Regional Districts in the province, and the provincial government is encouraging all local governments to consider approaches such as Integrated Resource Recovery that look at liquid and solid "waste" not as something to be disposed of, but something to value as a potential source for other purposes, such as district heating or a waste-to-energy facility.

Measuring Waste Management

Solid waste management is measured in terms of volumes of garbage and recyclables disposed of at regional facilities. Liquid waste management is a measure of the ability to appropriately treat this waste stream so that it does not result in water quality or health issues.

Solid Waste

Solid waste management is a Regional District responsibility. Currently, solid waste is collected and sent to regional facilities such as Bings Creek, Meade Creek and Peerless Road.

The Bings Creek Solid Waste Management Complex is the regional transfer station for the consolidation of the majority of the region's residual solid waste. Bings Creek receives waste from residential and commercial collection services, as well as from the Meade Creek and Peerless Road Recycling Drop-off depots. From Bings Creek, the waste is compacted and placed in transport trailers for shipment to the final disposal location (currently Rabanco in Washington State).

When the local garbage incinerator was closed down in the mid-1990s, the region started shipping solid waste to the Cache Creek landfill on the Lower Mainland. In 2007, the region started exporting garbage to Washington State instead. Recent provincial restrictions on out-of-province garbage shipments may compel the region to explore options closer to home, such as temporarily using the Hartland Landfill in the Capital Regional District.

Indicator and Measures

The region established a Zero Waste initiative in 2002, both as a challenge and a principle for developing a sustainable economy. The initiative focuses on reducing the region's environmental footprint by minimizing the amount of waste that must be land-filled through reduction, reuse and recycling. Ways to move towards the Zero Waste goal are set out in the region's Solid Waste Management Plan.[180]

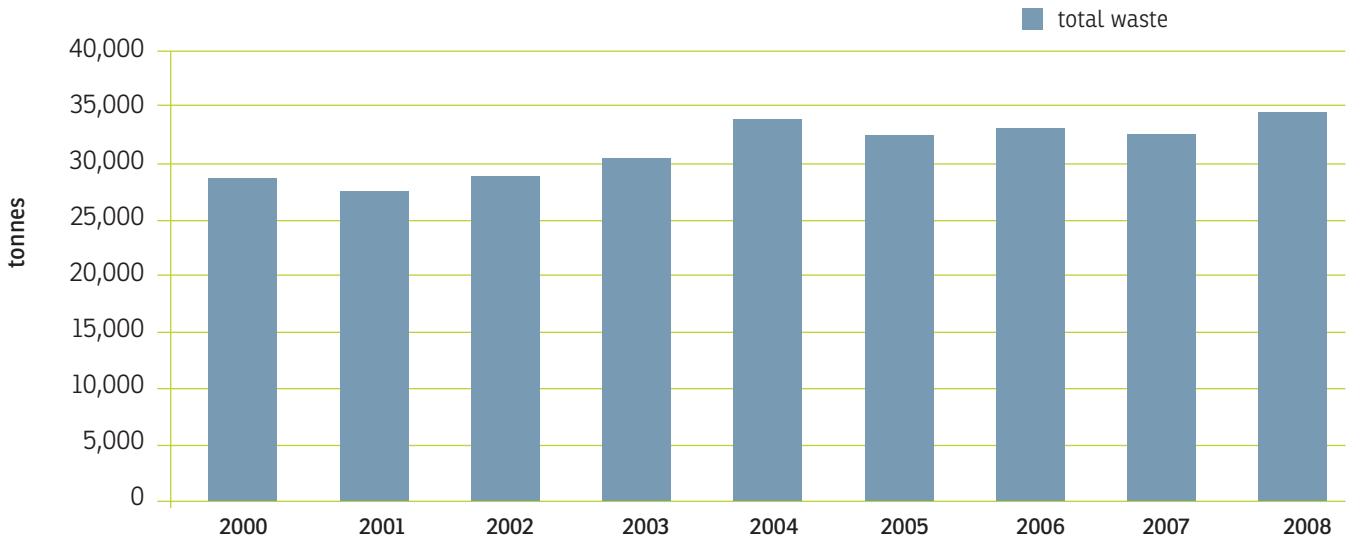
Solid waste can be measured as the total and per capita volume of waste disposed of, as well as the total and per capita volume of recyclables brought to CVRD facilities. However, this does not include information on organic waste that is composted or burned, garbage that is left by the roadside (illegal tipping), or bottles and cans brought to depots for refund.

Findings

Waste disposal

Total waste disposal has increased over the past decade, from about 28,000 tonnes in 2000 to 33,000 tonnes in 2008 (Figure 3.28).

FIGURE 3.28: Total waste disposal, CVRD 2000–2008

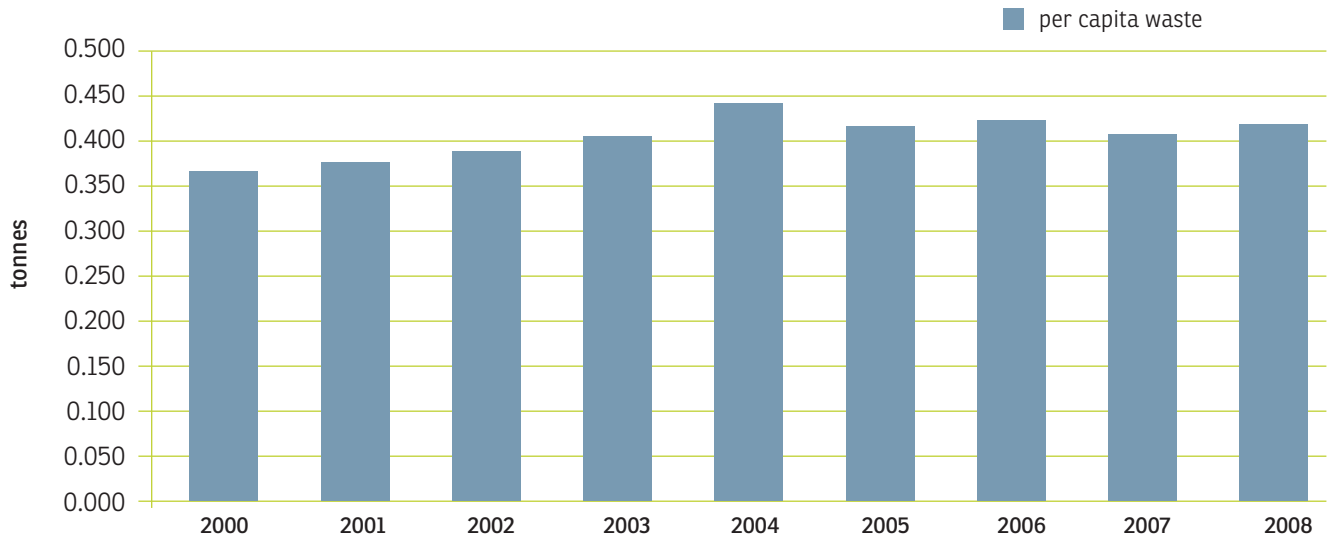


Source: CVRD Annual Monitoring Report, 2007.

180 CVRD Engineering Services, Solid Waste Management Plan, Amendment No. 3, 2006.

However, the regional population has also grown during this period. While the per capita amount of waste disposal has increased overall since 2000, it has declined somewhat since the middle of the decade (Figure 3.29), perhaps in response to greater recycling rates and greater awareness of the need to reduce waste.

FIGURE 3.29: Per capita waste disposal, CVRD 2000–2008



Source: CVRD Annual Monitoring Report, 2007.

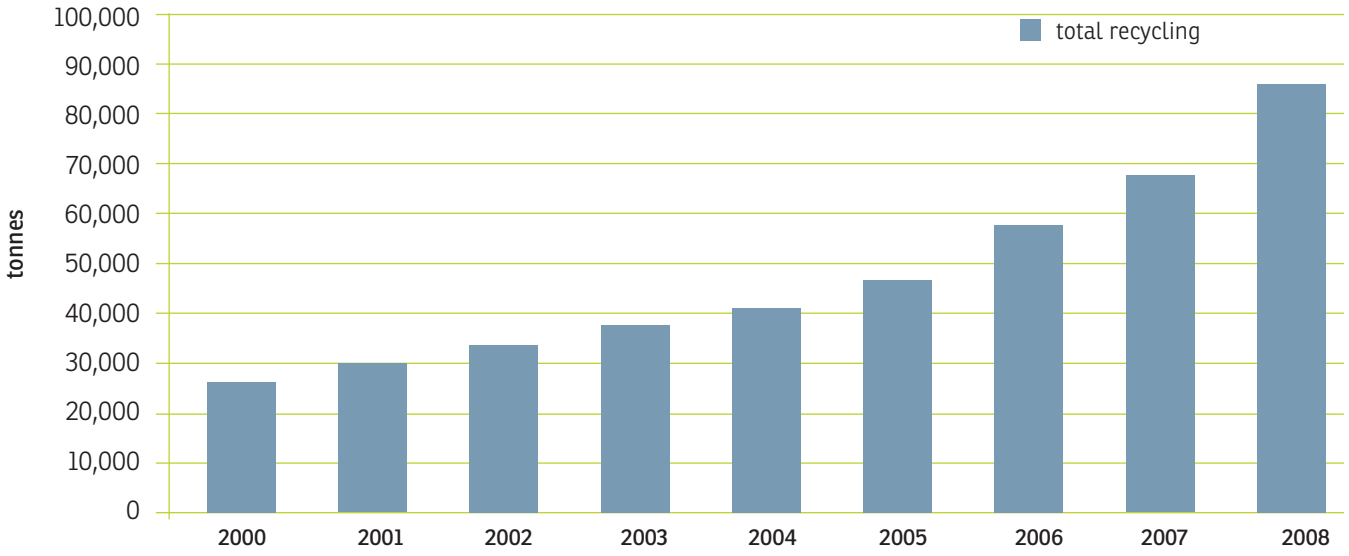
Waste disposal volumes are also affected by the economic climate; for example, during times of increased construction, more construction waste will be brought to landfills.

Recycling

Recycling programs are part the Regional District's Zero Waste initiative. Recycling programs, and the rate of participation, have increased very considerably over the past decade, from about 26,000 tonnes in 2000 to nearly 86,000 tonnes in 2008 (Figure 3.30). Residents and businesses can recycle paper (newspaper and mixed paper), metal containers and aluminum foil, a variety of plastics, and corrugated cardboard through the Blue Box program. Regional recycling participation rates reached a historic high of 75% per person in 2007, but declined slightly in 2008 to 71.9%.[181]

181 CVRD, 2010.

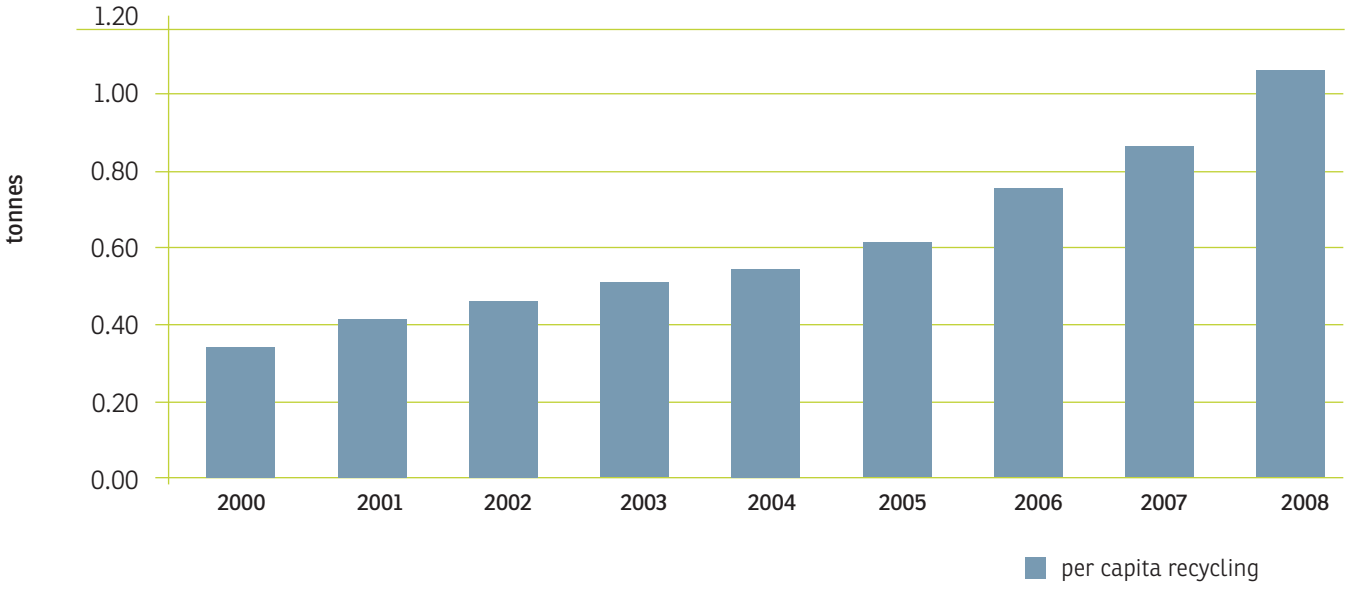
FIGURE 3.30: Total recycling, CVRD 2000–2008



Source: CVRD Annual Monitoring Report, 2007.

Per capita recycling rates have also seen a steady increase, from 0.34 tonnes per capita in 2000 to 1.06 tonnes per capita in 2008 (Figure 3.31).

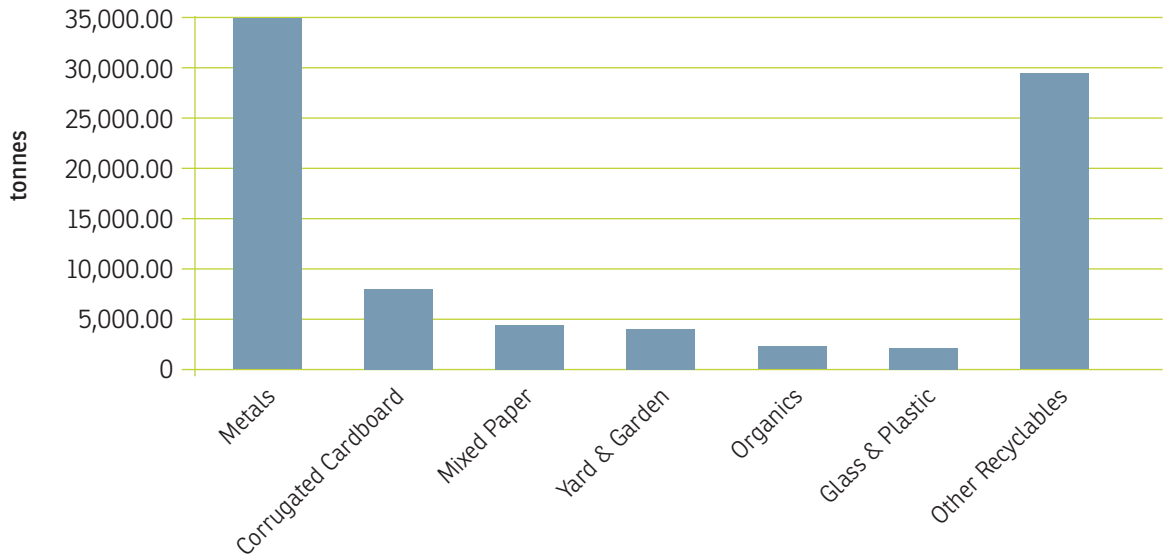
FIGURE 3.31: Per capita recycling, CVRD 2000–2008



Source: CVRD Annual Monitoring Report, 2007.

Metals are by far the largest category of recycled materials by weight (Figure 3.32).

FIGURE 3.32: Recycled materials by weight



Source: CVRD Annual Monitoring Report, 2007.

Higher recycling rates are very laudable. However, it should be noted that the combined volume of waste and recycled materials has doubled from 0.71 tonnes per capita in 2000 to 1.48 tonnes per capita in 2008, so the overall amount of "stuff" that residents are disposing of has increased considerably.

The Cowichan Recyclists offer businesses year-round pickup of recyclable materials – using a bicycle.

Organic Waste

Organic waste makes up about 3% of the waste stream. While this is a small proportion, organic waste is increasingly being recognized as a valuable resource both for composting and for waste-to-energy through anaerobic digestion.

In 2006 the Town of Ladysmith introduced curbside organic waste pickup. The organic waste is converted to compost at a plant in Nanaimo.

The CVRD has several initiatives planned, including the introduction of residential food waste collection, the addition of new products (such as electronic waste) to recycling programs, the development of a new regional recycling depot, better enforcement of existing diversion bylaws, and increased education and communication with residents and the private sector. The goal is to achieve 50% reduction in per capita waste disposal rates over the 1990 levels.[182]

Liquid Waste

Liquid waste (sewage) in the Cowichan Region is managed through a combination of local government treatment plants, private wastewater treatment systems and septic fields serving individual homes or small clusters of homes. Any of these can cause problems for water quality and ecosystem health if they are not well managed. Private septic systems are especially challenging to monitor and enforce, as their performance cannot be measured on an ongoing basis, and because failing septic systems are often not recognized until they result in downstream problems.

The CVRD currently manages 15 sewer systems, with different requirements for each system. There are four classes of treatment:

> Class A treatment applies anytime there is a drinking water well nearby (within 300 m of the disposal field);

> Class B is similar (high level of treatment) but with lower standards for nitrate levels if there is room to remediate in the ground (thereby posing no threat to drinking water);

> Classes C & D apply where there is a lower risk of contamination to the water supply (this depends on the receiving environment).

182 Ibid.

In situations where the sewer discharges into a body of water (e.g., the Joint Utilities Treatment facility, which serves the City of Duncan, North Cowichan, Cowichan Bay, Eagle Heights and portions of Cowichan Tribes, discharges into the Cowichan River) the treatment standards are much higher. More information on water quality related to septic and sewage is included in Section 2.6.

CVRD-operated systems range in size from 40 homes to 800. In addition to its own systems, the CVRD routinely takes over privately run systems (package plants) that are failing, and then brings them up to provincial standards. The CVRD typically takes over two to three package plants a year. The CVRD has now adopted a policy that requires all new private package plants be built to standard, and then turned over to the CVRD for operation.

In 1998, a South Sector Liquid Waste Management Plan was conducted to address a variety of issues:

> Wastewater contamination at Shawnigan Lake and the Mill Bay foreshore;

> Elevated coliforms in surface water sources;

> Elevated nitrates in groundwater;

> Nutrient loading (nitrogen and phosphorus) leading to eutrophication[183] in some surface waters;

> Concerns about Saanich Inlet water quality raised by the Saanich Inlet Study; and

> Increased pressure on the treatment and disposal of liquid waste resulting from population growth.

In 1999, the CVRD prepared a Central Sector Liquid Waste Management Plan to address:

> Replacement of the Cowichan Bay treatment plant; and

> Reduction of the phosphorus load to the Cowichan River.

The plan also looked at a source control program to reduce the discharge of inappropriate waste to the sewer systems.

One aspect of liquid waste management that is being adopted or is under review by other local governments in British Columbia and elsewhere is an approach that utilizes the resources (notably heat, energy and soil amendments) from liquid waste. This is described by the provincial government in their Integrated Resource Recovery approach.[184] To date, this approach has not been implemented in the Cowichan Region.

183 Excessive nutrients in a lake or other body of water, usually caused by runoff of nutrients (animal waste, fertilizers, sewage) from the land.

184 www.cd.gov.bc.ca/lgd/infra/resources_from_waste.htm

Indicator and Measures

The Ministry of Environment monitors larger treatment plants to ensure that they meet provincial standards. Smaller systems (septic systems for less than 15 homes, or under 22,730 litres[185] per day flow) are monitored by the Vancouver Island Health Authority (VIHA).

Many operators of private wastewater systems do not routinely sample their effluent, even though this is a requirement from the Ministry of Environment.[186] The CVRD does not keep track of private wastewater systems. Unless a problem arises, there is no way to track the day-to-day functioning of these systems (where a water system shows higher-than-normal levels of nitrates and phosphates, VIHA can go after the water system operator, but has no way to address how the wastewater plant is being operated.) The Ministry of Environment can charge a plant operator under groundwater protection legislation, but this is a reactive rather than preventive approach.[187] An additional "unknown" is how many septic fields are below the water table during the winter (and therefore ineffective at treating effluent), for example around Cowichan Lake.

Findings

Discharges from local government treatment systems have created health concerns from time to time. Nutrient loading is a big issue. In the Cowichan River, there are two sewage treatment plant discharges (Town of Lake Cowichan and North Cowichan/Duncan sewage lagoons). There is evidence of increasing nutrient levels downstream of North Cowichan/Duncan, despite significant improvements to the discharge.[188] The quality of discharge coming from the North Cowichan/Duncan sewage lagoons has improved significantly in recent years (80% reduction in phosphorus) as a result of a new phosphorus removal system that was constructed to reduce the amount of phosphorus discharged to the Cowichan River. Typical phosphorus loadings have been reduced from an average of 4.5 ppm to less than 1 ppm.[189]

185 5,000 gallons

186 Louise Knodel-Joy, Sr. Engineering Technologist, Water Management, CVRD, personal communication, 2009.

187 Ron Cook, Public Health Inspector, Vancouver Island Health Authority, personal communication, 2009.

188 Deb Epps, Environmental Impact Assessment Biologist, BC Ministry of Environment, personal communication, 2009

189 From North Cowichan website: www.northcowichan.bc.ca/siteengine/ActivePage.asp?PageID=154 . This page includes figures about the population served by these sewage lagoons..

The greatest concerns relating to liquid waste arise from the private septic fields. As noted in Section 2.6, leaking septic fields can harm water quality, as shown by the examples of evidence in the Cowichan/Koksilah systems and Shawnigan Lake. Management plans for Quamichan[190], Fuller and Shawnigan Lakes include strategies to get houses off septic systems.[191] The major concern is that there is no day-to-day monitoring of septic fields, and problems are only identified (if at all) when a concern is raised and VIHA is asked to investigate.

Summary

The CVRD has set a long-term goal of Zero Waste, with a more immediate goal of achieving a 50% per capita reduction in the disposal of solid waste (over 1990 levels) and has an extensive recycling program to support this. The volume of recyclables has risen significantly in the past ten years, both in terms of total volume and per capita volumes. At the same time, however, total and per capita volumes of solid waste (garbage) have also increased, indicating that while people are recycling more, they are also buying (and disposing of) more "stuff".

Results for liquid waste management indicate that the CVRD is working to take over, and bring up to provincial standard, more of the smaller treatment plants, thus addressing some of the issues related to leaking septic fields. However, there remain many septic fields that continue to contribute to water quality issues in the region.

190 www.quamichanlake.ca/sites/default/files/QuamichanWatershedManagementPlanFinal-October2009.pdf

191 Deb Epps, December 2009.

Missing Information

Information on the composition of the solid waste stream (e.g., electronics, plastics, construction waste) was not available. This data would provide more information on the major sources of solid waste, and direction on where to look for further ways to eliminate, reduce or recycle waste from these sources.

With respect to liquid waste, the CVRD does not keep track of private wastewater systems. Unless a problem arises, there is no way to track the day-to-day functioning of these systems (where a water system shows higher-than-normal levels of nitrates and phosphates, VIHA can investigate, but does not have the authority to address how the wastewater plant is being operated). The Ministry of Environment can charge a plant operator under groundwater protection legislation, but this is a reactive rather than preventive approach. An additional "unknown" is how many septic fields are below the water table during the winter (and therefore ineffective at treating effluent), for example around Cowichan Lake.

References

BC Ministry of Community and Rural Development. 2009. Resources from Waste: A Guide to Integrated Resource Recovery. Available from www.cd.gov.bc.ca/lgd/infra/resources_from_waste.htm

CVRD. 2007. Solid Waste Management Plan. Annual Monitoring Report.

CVRD. 2010. Recycling and Waste Management Annual Progress Report. www.cvrd.bc.ca/documents/Engineering%20Services/Solid%20Waste/Planning/2008AnnualSWReport.PDF

Dayton and Knight. 1999. Central Sector Liquid Waste Management Plan. Report Prepared for the CVRD. www.cvrd.bc.ca/documents/Engineering%20Services/Utilities/Liquid%20Waste%20Management%20Planning/central%20sector%20liquid%20waste%20management%20plan.pdf

Stanley Consulting Group. 1998. South Sector Liquid Waste Management Plan. Report Prepared for the CVRD. www.cvrd.bc.ca/documents/Engineering%20Services/Utilities/Liquid%20Waste%20Management%20Planning/SSLWMP-JUNE07.PDF

3.6 Leadership and Innovation

Introduction

Leadership and Innovation in the Cowichan Region

Communities within the Cowichan Region, as well as the Cowichan Valley Regional District (CVRD) itself, are increasingly concerned about making themselves more environmentally, socially and economically sustainable. Sustainable Cowichan's "12 Big Ideas" starts by noting that:

> *"If we carry on living for today and not thinking about tomorrow, we run the risk of losing some of our natural assets forever. We believe we must start right away to strengthen our environment and community by growing in smart ways, to repair the damage we have done to our natural assets and preserve them for future generations. And that local government must lead the way in this effort. This is why we put together our list of big ideas for making our region more sustainable. This list is made up of small, medium and large actions we need to take to build a strong, resilient Cowichan."*[192]

Measuring Leadership and Innovation

The intent of this section is not to provide statistical data, but rather to capture just a few of the ways that the Cowichan Region, governments, business and industry, community organizations, and individual citizens are striving to create a healthy and sustainable environment in the Cowichan Region.

This list is clearly incomplete. There are far too many initiatives, large and small, to capture in this report. However, the intent is to provide a flavour of the work taking place, and a sense of hope that among the many issues and challenges that we are facing, there are groups and individuals who are striving to make a difference to this region and beyond. These examples have been organized under the "12 Big Ideas" headings.

192 http://www.12things.ca/12things/punchline.php

Leadership and Innovation

Get Real about Climate Change

> The Cowichan Action on Climate Change/Cowichan Carbon Busters is a group of citizens working to help the community make the transition to a non-fossil fuel economy.

> The municipalities of Duncan, North Cowichan, Ladysmith and Lake Cowichan are putting emissions reductions targets into their Official Community Plans.

> The CVRD is developing an integrated flood management plan to address flooding and drought issues in several parts of the region already being affected by climate change.

> The CVRD is developing a greenhouse gas emissions reduction plan for its facilities.

Eat Local Because Food Security Matters

> Cowichan Green Community is developing a Cowichan Local Food Map to improve community access to food in the Cowichan Valley and encourage people to buy and grow local foods.

> Economic Development Cowichan has developed an Area Agriculture Plan to look at the region's agricultural capacity. This includes an Issues and Opportunities Report which will form the basis for an action plan.

Be Energy Smart

> The Cowichan Valley School District 79's Live Smart BC initiative has reduced energy use in schools.

> Queen Margaret's School Science and Technical Centre and renovations to Spurgin Hall have incorporated numerous energy efficient features including a heat recovery ventilation system, an HVAC system for in-floor radiant heat, passive solar features, and recycled building materials. The building was constructed using timber from the site and was located to take advantage of the surrounding woodlands, thereby reducing the impact to the natural environment.

> Providence Farms' St. Ann's building utilizes numerous energy efficient construction elements, including passive solar energy, the first cob wall in North Cowichan, sensitive design, and materials and finishes that will not impact people with environmental sensitivities.

> The CVRD is conducting a review of the energy and water efficiency of its buildings.

Get Up to Speed on the New Green Economy

> The Town of Ladysmith's Trolley Service supports sustainability by reducing greenhouse gases, provides increased mobility for residents and visitors of all ages, reduces parking congestion at the town's two major shopping areas, and strengthens the local economy by enabling more people to access local businesses.

> Catalyst Paper's Crofton Mill implemented a "Power Watchers" program that identified potential electricity savings of 11 – 15% ($4.7 – $6.5 million in annual energy savings).

Clear the Air to Reduce Carbon Emissions

> The Idle Free BC program in Ladysmith educates people about reducing idling time to improve air quality.

> The Municipality of North Cowichan and CVRD offer a rebate program to people who install newer, more efficient and less polluting wood burning stoves.

> The Bings Creek Solid Waste Management Complex now accepts yard waste and wood trimmings free of charge as an alternative to backyard burning, thereby improving air quality.

Don't Hog the Water so There is Enough for All

> The CVRD is actively engaged in the Cowichan Basin Watershed planning process, and is developing a regional water quality monitoring plan. This plan will examine water quality and conduct a benthic analysis for each of the region's watersheds, including two marine sites (Cowichan Bay and Ladysmith harbour).

> The City of Duncan, Town of Ladysmith and CVRD water service areas offer rebates to homeowners who replace older toilets with low flush (3l or 6l) toilets.

> There are automatic summer watering restrictions throughout the Cowichan Region (June 1- October 31); these can be more severe if there are drought conditions.

Grow Up, Not Out

> North Cowichan's new Official Community Plan (OCP), currently under development, focuses on strategies related to smart growth, sustainable communities and the avoidance of sprawl.

> The joint development of a South Cowichan OCP process is providing synergies in a subregional context and will strengthen smart growth principles.

> The Regional District's decision to develop a regional sustainability plan will provide background information necessary to balance the rural nature of the majority of the region with the need to encourage smart growth development patterns (and the provision of associated services) in the future.

Revive Biodiversity

> The Somenos Marsh Wildlife Society operates, maintains, manages, and preserves the Somenos Marsh Conservation Area for the study of nature, the observance of flora and fauna, the protection of wildlife habitat and for public education.

> The Quamichan Watershed Stewardship Committee works to restore and maintain the health of the Quamichan Watershed as an important fish and wildlife habitat and recreation area.

> Trees for Tomorrow grants from the BC Provincial government have provided the opportunity to plant trees in several areas of the Cowichan Region.

> CVRD Parks has a program to remove invasive species in parks.

> The CVRD will be reviewing and updating the South Cowichan Liquid Waste Management plan in the coming year.

Get Serious About Zero Waste

> Local Thrifty's Food Stores stopped using plastic bags in 2009 and ask customers to use reusable cloth bags or compostable/recyclable paper bags.

> Cowichan Recyclists[193] provide recycling services to local businesses by bicycle, picking up mixed recycling and organics for approximately 80 businesses in Duncan and Cowichan Bay.

> Various CVRD departments are working to reduce waste by going paperless, encouraging recycling, and reducing the use of bottled water.

Be Carbon Neutral

> The Regional District and municipalities have all signed the BC Climate Action Charter, committing to be carbon neutral in respect to their operations by 2012.

> The CVRD has replaced the oil furnaces at Mesachie Lake Main Hall and Honeymoon Bay Community Hall with new heat pumps.

> Major retrofits have taken place at the Island Savings recreational centre to reduce energy usage.

193 http://www.cowichanrecyclists.com/index.html

Audit our Assets

> The CVRD has a Sensitive Habitat Atlas that allows people to identify the location of various environmental features and data, including salmon streams, wetlands and hydrology.

> The CVRD will be updating their aerial photography database and collecting valuable LIDAR data in the coming year.

> This State of the Environment report is a way of tracking environmental values.

Lead the Way

> The CVRD will soon begin work on a regional sustainability plan.

> The Cowichan Stewardship Round Table (CSRT) has established a forum to share information, identify communities of interest, rank projects at a watershed scale, pool resources, attract funders, and enable a new way of conducting stewardship business.

> The Stolz slide remediation has been recognized as the largest river restoration in BC.

> The Cowichan Watershed Board has been established and recognized by the Province as leading the way in the development of watershed-based governance.

4.0 Future State of the Environment Reporting

This 2010 State of the Environment report is the first of its kind for this region, and provides a snapshot of the wide and complex environmental issues facing the Cowichan Region. The report endeavours to establish some reliable and repeatable ways of measuring how the environment is doing.

In preparing this report, there were significant challenges in finding the data to "tell the story" of the Cowichan Region and its natural environment. In some cases data were readily available, in other cases the data were either lacking entirely or were less than desirable for the purpose. Nonetheless, this report has begun the process of tracking progress (or lack of) towards maintaining and restoring a healthy natural environment in this ecologically rich and special region.

The CVRD Environment Commission hopes that this report will spur the collection and release of additional data that will help to better "tell the story", and that there will be future State of the Environment reports that add to and build on the findings of this first report.

Appendix A: Full List of Known Species at Risk

Class (English)	English Name	Blue	Red	Grand Total
Amphibians	Red-legged Frog	1		
Amphibians Total		1		1
Birds	Band-tailed Pigeon	1		
	Barn Owl	1		
	Barn Swallow	1		
	Cassin's Auklet	1		
	Double-crested Cormorant	1		
	Great Blue Heron, fannini subspecies	1		
	Green Heron	1		
	Marbled Murrelet		1	
	Northern Goshawk, laingi subspecies		1	
	Northern Pygmy-Owl, swarthi subspecies	1		
	Olive-sided Flycatcher	1		
	Peregrine Falcon, anatum subspecies		1	
	Peregrine Falcon, pealei subspecies	1		
	Purple Martin	1		
	Short-eared Owl	1		
	Sooty Grouse	1		
	Tufted Puffin	1		
	Vesper Sparrow, affinis subspecies		1	
	Western Screech-Owl, kennicottii subspecies	1		
	White-tailed Ptarmigan, saxatilis subspecies	1		
Birds Total		16	4	20
Gastropods	Black Gloss	1		
	Blue-grey Taildropper		1	
	Broadwhorl Tightcoil	1		
	Dromedary Jumping-slug		1	
	Oregon Forestsnail		1	
	Pacific Sideband	1		
	Scarletback Taildropper	1		
	Threaded Vertigo		1	
	Umbilicate Sprite	1		
	Warty Jumping-slug	1		
	Western Thorn	1		
	(blank)		1	

Class (English)	English Name	Blue	Red	Grand Total
Gastropods Total	7	5	12	
Insects	Autumn Meadowhawk	1		
	Beaverpond Baskettail	1		
	Blue Dasher	1		
	Boisduval's Blue, blackmorei subspecies	1		
	Common Ringlet, insulana subspecies		1	
	Dun Skipper	1		
	Edith's Checkerspot, taylori subspecies		1	
	Greenish Blue, insulanus subspecies		1	
	Johnson's Hairstreak		1	
	Moss' Elfin, mossii subspecies	1		
	Propertius Duskywing	1		
	Western Branded Skipper, oregonia subspecies	1		
	Western Pine Elfin, sheltonensis subspecies	1		
	Western Pondhawk	1		
	Zerene Fritillary, bremnerii subspecies		1	
Insects Total		10	5	15
Lampreys	Cowichan Lake Lamprey		1	
Lampreys Total		1	1	
Mammals	American Water Shrew, brooksi subspecies		1	
	Ermine, anguinae subspecies	1		
	Keen's Myotis		1	
	Roosevelt Elk	1		
	Steller Sea Lion	1		
	Townsend's Big-eared Bat	1		
	Vancouver Island Marmot		1	
	Wolverine, vancouverensis subspecies		1	
Mammals Total		4	4	8
Ray-finned Fishes	Cutthroat Trout, clarkii subspecies	1		
	Dolly Varden	1		
Ray-finned Fishes Total		2		2
Reptiles	Sharp-tailed Snake		1	
Reptiles Total		1	1	
Turtles	Western Painted Turtle–Pacific Coast Population		1	
Turtles Total		1	1	
Grand Total		40	21	61

Appendix B: Major Water Suppliers, CVRD

MAJOR PUBLIC SUPPLIERS	Area	Number of hook-ups
Cowichan Valley Regional District	Arbutus Mountain Estates (Area B: Shawnigan Lake) – groundwater (wells)	Serves 165 modular homes and a clubhouse facility
	Cherry Point Estates (Area D: Cowichan Bay) – groundwater (well)	Serves 30 single-family dwellings
	Dogwood Ridge Water System (Area E: Cowichan Station/Sahtlam/Glenora) – groundwater (well)	N/A
	Fern Ridge (Area A: Mill Bay) – groundwater (well)	Serves 28 residences
	Honeymoon Bay (Area F) – groundwater (well)	Serves approximately 129 single-family dwellings, two recreational parks (180 sites), and six small commercial and institutional developments
	Kerry Village – (Area A: Mill Bay) – groundwater (well)	Serves 62 residences
	Lambourn Estates (Area D: Cowichan Bay) – groundwater (wells)	Serves 137 residences
	Mesachie Lake (Area F:Cowichan Lake South/ Skutz Falls) – groundwater (well)	Serves 96 residential and commercial properties
	Saltair (Area G: Saltair/Gulf Islands) – surface water from Stocking Lake	Serves about 831 residential and commercial properties
	Satellite Park (Area C: Cobble Hill) – groundwater (well)	Serves 78 residences
	Shawnigan Lake North (Area B: Shawnigan Lake) – primary source is surface water (Shawnigan Lake), supplemented by groundwater (well).	Services approximately 633 single-family dwellings, a condominium complex, and an elementary school
	Youbou (Area I: Youbou/Meade Creek) – surface water (Youbou Creek) and two wells at Lakeside Estates	Serves 308 residences and 11 commercial buildings

MAJOR PUBLIC SUPPLIERS	Area	Number of hook-ups
Town of Ladysmith	Ladysmith and part of Saltair – surface water (Holland Creek and Stocking Lake)	N/A
District of North Cowichan	Town of Chemainus and Chemainus First Nation – groundwater (wells)	N/A
	South End of District of North Cowichan – groundwater (well)	N/A
City of Duncan	Duncan – groundwater (wells)	Serves 3,000 residences, and 550 commercial and other buildings
Town of Lake Cowichan	Town of Lake Cowichan – surface water (Cowichan Lake)	Serves a population of approximately 3,000 people
Cowichan First Nation	Cowichan First Nation – groundwater (wells)	Serves approximately 425 residences.
Halalt First Nation	Halalt First Nation – groundwater (well)	Serves 60 residences and 4 businesses
Kuper Island First Nation	Kuper Island First Nation – groundwater (well)	Serves 100 residences
Malahat First Nation[194]	Malahat First Nation – groundwater (wells)	Serves 25 residences
MAJOR PRIVATE SUPPLIERS		
Braithwaite Water System	Cobble Hill	N/A
Burham Park Water System	Cobble Hill	N/A

194 Note: This chart does not include the smaller First Nations in the Cowichan Region.

MAJOR PRIVATE SUPPLIERS		
Catalyst Mill (in partnership with the District of North Cowichan)	Town of Crofton	Serves a population of approximately 2,500
Cobble Hill Water System	Cobble Hill	N/A
Cowichan Bay Water System	Cowichan Bay	N/A
Diamond Waterworks	Area H: North Oyster/Diamond	N/A
Lidstech Water System	Shawnigan Lake Village	N/A
Meredith Road Improvement District	Shawnigan Lake	Serves approximately 50 residences
Mill Bay Waterworks	Mill Bay	N/A

Environment Commission | Cowichan Valley Regional District

December 2010

2010 STATE OF THE ENVIRONMENT

CVRD ENVIRONMENT COMMISSION

Environment Commission | Cowichan Valley Regional District

December 2010